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Panel data analysis of internal conflict and income inequality

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Abstract. The study determines how worsening internal and external conflict affects income inequality. The paper accounts for contributing variables and analyzes panel data in an unbalanced panel of 106 countries from 1988 to 2018—the panel data model groups by development status. The econometric model uses Driscoll and Kraay standard errors to account for heteroscedasticity, cross-sectional dependence, and autocorrelation. Worsening internal conflict increases income inequality in developing countries but not in developed countries. Worsening of internal conflict by one standard deviation increases income inequality by 0.068 in developing countries. External conflict does not noticeably affect income inequality in developed or developing panels.

Keywords. Income inequality, Gini coefficient, internal conflict, external conflict

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1. Introduction¹

For centuries, income inequality has been a topic of interest (Sahota, 1978). Plato discusses income inequality and its effects on the Polis in *The Republic*. Income inequality has increased in many countries over the last forty years (United Nations, 2021). Its growth and persistence is an important subject because of its adverse effects economically, socially, and politically (Posner, 1997; Barry, 2005; Karklins, 2005; Dorling, 2011; Dabla-Norris et al., 2015; Ariely and Uslaner, 2017). Additionally, studying income inequality is vital because current income inequality can lead to future income inequality. Specifically, intergenerational transmission of income inequality can lead to future undesirable economic, social, and political effects (Ermisch and Smeeding, 2012).

Many studies on the conflict-inequality nexus focus on income inequality as a driver of conflict (Bircan, Brück, and Vothknecht, 2017). Some researchers claim income inequality can cause conflict (Feirabend and Feirabend, 1966; Gurr, 1968; Huntington, 1968; Dobson and Romlogan, 2009; Haggard and Kaufman, 2012). De Tocqueville (1835) claims that most uprisings and

¹ All data used in the study are publicly available and accessible. We want to acknowledge funding for the ICRG dataset from Pepperdine University and helpful suggestions and comments from David Smith, Jared Ashworth, Blake Withall, and the anonymous referee of the European Journal of Government and Economics. Any remaining shortcomings are those of the authors.



revolutions are instigated because of high income inequality. In addition, theoretically, the greater the income inequality in a country, lower income individuals are worse off and have a greater incentive to rebel (Haggard and Kaufman, 2012).

There is less research on the effects of conflict on income inequality, and findings are mixed (Alesina and Perotti, 1996; Collier, 1999; Bircan, Brück, and Vothknecht, 2017). One claim is civil wars affect short-run economic performance but not fundamental drivers of longer-term economic performance (Blattman and Miguel, 2010). Thus, Blattman and Miguel (2012) claim income distribution remains persistent regardless of conflict, including civil war. On the other hand, other researchers claim conflict increases income inequality through its effects on economic growth and investment (Alesina and Perotti, 1996; Bircan, Brück, and Vothknecht, 2017).

This study examines the effects of conflict on income inequality measured by the net Gini coefficient (income distribution after tax and transfer). The Gini coefficient is an index between (0) and (100), with the former representing perfect income equality while the latter shows the utmost inequality. The study proposes that an increase in internal conflict causes higher income inequality. The study's premise is that conflict affects different segments of a society differently and causes changes in income distribution among these segments. Firstly, conflict is less likely to disrupt upper income individuals' incomes than middle- and lower-income individuals. Middle-class and lower income groups are more likely to feel the adverse effects of economic disruptions, e.g., they are more likely to lose their jobs (Alesina and Perotti, 1996). Affluent production owners can safeguard their wealth and income by changing production to military goods or by moving abroad and continuing to earn income (Pugh, 2003). Secondly, since conflict disrupts economic activities, it reduces tax revenue (personal income, business, and tariffs on imports), which reduces the amount that can be redistributed to lower income groups, thus increasing income inequality (Pugh, 2003). Thirdly, not only does government revenue decline when there is conflict, but the government also allocates the reduced receipts to the military and police instead of redistributing it, especially away from education (Milanovic, 2016). Subsequently, low income individuals that have the potential to increase their incomes through education may not have the opportunity.

The effects of conflict on income inequality can happen quickly or over time. Low income individuals may lose their job as soon as conflict disrupts the economy, impacting income inequality immediately. At the same time, a generation of lower income individuals may have less access to subsidized education if there is either a reduction in gross tax revenue or the allocation of tax revenue is used on the military instead of education. The study explores the persistence of income inequality by lagging the Gini coefficient for up to five years.

The research extends the literature on income inequality by analyzing more comprehensive conflict measures, extending the analysis length, and using data as recent as 2018. This study also improves the econometric model, controls for important covariates, and analyzes differences between developed and developing countries. Finally, the study finds worsening internal conflict causes an increase in income inequality in developing countries but not developed ones. The finding is unique to this study and supports Kuznets's theory of the impact of economic

development, economic growth, and income inequality.

The literature review focuses on the relationship between income inequality and conflict, while the data section discusses the sources of variables in the study. The design of the panel data analysis is in the methods section. The findings, discussion, and conclusion sections offer insight into the results and consider the study's contributions and limitations.

2. Literature review – Conflict as a determinant of income inequality

Internal and external conflict can lead to instability through coups, constitutional crises, terrorism, war, and others (Posner, 1997). Research finds economic effects of conflict and instability may lead to changes in income inequality (Nagel, 1974; Hardy, 1979; Weede, 1981; Alesina and Perotti, 1996; Cederman, Weidmann, and Gleditsch, 2011). For example, Alesina and Perotti (1996) claim that conflict increases instability, which affects income inequality by hindering economic growth and discouraging foreign investment. Alesina and Perotti use a panel of 70 countries from 1960-85 and measure political instability through an index based on the number of politically motivated assassinations, coup d'états, and regime type. This study extends the literature by analyzing more comprehensive measures of conflict, including "perceived" risk. The International Country Risk Guide (ICRG) measure of internal conflict includes the risk of civil war/coup d'état threat, terrorism/political violence, and civil disorder.

Although conflict can increase economic uncertainty and disrupt economic activity, its effect on income inequality is not certain. Economic growth's impact on income inequality depends on the level of economic development. Kuznets (1955) and Kaldor (1957) find that as a country's income grows, inequality initially worsens and then improves later. They posit that when a country is underdeveloped, the per capita income is low for most people. Consequently, measures such as the Gini coefficient indicate low income inequality. As the country begins to develop, economic growth begins, which makes the associated economic sector and the region experience higher per capita income and income inequality. It will result in an increase in the Gini coefficient for the country. As the country continues to develop and more sectors and regions receive a higher income, it reduces income inequality, hence the Gini coefficient. Thus, the effects of conflict on income inequality through economic growth may partially depend on a country's place on the Kuznets Curve. In addition, foreign direct investment and free trade may lead to growth and expansion in industries that lead to higher income inequality. On the other hand, what if conflict lead to economic turmoil, recession, and broad economic despair regardless of whether a country is in the high- or low-income category? In this scenario, conflict could lead to greater income equality.

War is a subcomponent of both the internal and external ICRG conflict measures. Evidence suggests wars, especially civil wars, adversely affect gross national income (GNI) and income distribution (Collier and Hoeffler, 2007). Also, studies find the emergence of a minority class of war profiteers can increase the Gini coefficient (Pugh, 2003; Bircan, Brück, and Vothknecht, 2017). If the upper income group is immune to conflict, while the middle and lower classes lose

income due to the destruction of the economy and job opportunities, then conflicts cause income inequality. Collier (1999) researches the consequences of civil wars on GDP and the economy's composition and finds that gross domestic product (GDP) per capita declines by 2.2%, primarily through a reduction in production and loss of capital stock. Collier's (1999) research is limited by its small sample size and focus on the extreme cases of full-blown civil wars. This research analyzes more comprehensive measures of internal and external conflict, which allows a larger panel of countries.

The long run implications of conflict are there may be fewer public funds for education and social welfare programs because of less GNI and subsequent tax revenue (Deininger and Olinto, 2000). Additionally, the need for military funds reduces resources available for education and social wellness programs which worsens income inequality (Collier and Hoeffler, 2002). Bircan, Brück, and Vothknecht (2017) use panel data from 161 countries from 1960-2014 to analyze the effects of civil wars on income inequality and find an increase in income inequality ranging from 1.9 to 2.5 Gini points during a civil war and it continues up to ten years after a civil war. Bircan, Brück, and Vothknecht (2017) fail to control for important covariates, such as the dependency ratio (ratio of elderly and children to labor force), and their model does not control for the presence of cross-sectional dependence or autocorrelation, which impact large scale cross-sectional panels (Driscoll and Kraay, 1998). This study adds important covariates, improves the model to account for cross-sectional dependence and autocorrelation, and explores more comprehensive measures of conflict.

An additional consideration is some conflicts have increased GNI. For example, the United States entering World War II (WWII) spurred the United States economy and is broadly viewed as the catalyst that ended the Great Depression. The outcome of the engagement of the United States in World War II seems to be an exception to the norm. The income inequality in the United States declined immediately after WWII until around 1967 (Duquette, 2018). Another contributing factor is that the United States did not have any damages to its production facilities or infrastructure, apart from the shipyard facilities in Hawaii. Instead, the United States increased its output in almost every area, partly to provide goods, services, and weapons to Europe, which had lost substantial production capacity due to damages ((Duquette, 2018). The evidence suggests that when a country is not invaded, it can continue to increase its production capacity to get ahead of war-torn countries. One reason for England's ability to rise to global supremacy, despite its size and lack of substantial resources, was that it was rarely invaded, unlike other European countries (von Schulze-Gaevernitz, 1915).

Additionally, although there may be some economic growth cases from war, they come with high costs. War casualties and the need to retool factories for consumer goods have adverse short- and long-term effects. There may be few transferable skills employees can use once the economy shifts away from war-based manufacturing. War-driven economies can persist post-conflict and lead to high levels of military spending that continue to reallocate funds from education and social programs to the military (Pugh, 2003).

3. Methods and data

3.1 Data description and variable selection

Appendix A provides the name, source, and summary statistics of variables. The dependent variable is the net Gini coefficient as measured by the Standardized World Income Inequality Database (SWIID) (Solt, 2015). The net Gini measures income inequality after tax and transfer and is on a scale between (0) equal distribution to (100) most unequal distribution. The Gini coefficient is derived from the Lorenz curve that measures income distribution across households (Lorenz, 1905). The more evenly income is distributed across a population, the smaller the Gini coefficient. Table 1 shows differences in the net Gini coefficient between developed and developing countries. The mean net Gini is (10.2) points less in developed countries than in developing countries, which signifies lower income inequality. The minimum and maximum for developed countries are (16.8) for Slovakia and (51.6) for Chile. The range for developing countries is (22.6) for Belarus and Namibia (65.4).

Table 1. Net Gini Coefficient by Panel.

	Full Panel	Developed Countries	Developing Countries
Countries in Panel	106	42	64
Observations	2,744	1,132	1,612
Mean	38.5	32.0	42.2
Standard Deviation	8.72	7.02	7.35
Min-Max	16.8-65.4	16.8-51.6	22.6-65.4

Internal conflict measures the sum of the three subcomponents of risk of civil war/coup d'état threat, terrorism/political violence, and civil disorder. A score of (12) signifies the absence of conflict, no opposition to the government, and a government not engaging in arbitrary violence against its people. A score of (0) denotes an active civil war. As discussed in the literature review, the expectation is worsening internal conflict leads to an increase in the net Gini (Alesina and Perotti, 1996). Table 2 shows differences in internal conflict by panel. The mean internal conflict is (2.17) points higher in developed countries than in developing countries, which reflects less internal conflict. The minimum scores for developed countries are (3.0) for Chile and Israel during periods of severe internal conflict. Many developed countries have had the highest possible score of (12). For developing countries, the minimum is (0) for Lebanon, Sri Lanka, and El Salvador during periods of active civil war. Several developing countries have had the highest score of (12).

Table 2. Internal Conflict by Panel.

	Full Panel	Developed Countries	Developing Countries
Countries in Panel	106	42	64
Observations	2,744	1,132	1,612
Mean	9.02	10.4	8.23
Standard Deviation	2.23	1.51	2.22
Min-Max	0-12	3-12	0-12

External conflict measures the three subcomponents of the risk of an external war, cross-border conflict, and foreign pressure (e.g., sanctions and withholding of aid). A score of (12) indicates very low risk, while (0) signifies an active cross-border war. The researchers expect worsening external conflict will have less of an effect on income inequality than internal conflict for two reasons. First, external conflict, which includes nonviolent subcomponents as well as lesser conflicts including cross-border tension, is less likely to destroy production facilities or disrupt the production of goods and services. Second, the external conflict measure includes nonviolent factors such as sanctions and the withholding of aid which might not affect income inequality as much as violent conflict. Table 3 shows differences in external conflict by panel. The mean external conflict (1.11) points higher in developed countries, showing less external conflict. Iran and Lebanon have the minimum score of (0) in the developing panel of countries, representing an active cross-border war. The minimum for developed countries is (3) for Cyprus and Israel. Many countries for both developed and developing panels have the max score of (12).

The econometric model includes covariates accounting for demographics, economic development, trade/globalization, political economy, investment risk, economic growth, and unemployment. The covariates are based on the relationship with conflict or the need to account for confounding variables that otherwise could lead to spurious results. First, conflict by nature, is the crystallization of economic, social, and political problems. When there is a large discrepancy in income, conflict can manifest through economic, social, and political factors. Therefore, the model includes the covariates of per capita GDP, economic growth, political economy, unemployment, investment risk, institutional quality, trade, and the human capital index. Second, the model includes important covariates to account for the economic structure and population distribution.

Table 3. External Conflict by Panel.

	Full Panel	Developed Countries	Developing Countries
Countries in Panel	106	42	64
Observations	2,744	1,132	1,612
Mean	9.82	10.5	9.39
Standard Deviation	1.84	1.42	1.93
Min-Max	0-12	3-12	0-12

The natural log of per capita GDP accounts for differences in income and economic development (Heston et al., 2012). The economic growth rate is the annual GDP growth rate. Kuznets (1955) and Kaldor (1957) find economic growth increases income inequality when a country is in earlier stages of development, while economic growth can decrease income inequality as countries become richer. Therefore, the expectation is increases in the natural log of per capita GDP will increase income inequality for developing countries, but decrease income inequality for developed countries.

The human capital index scores a country's average schooling years and returns to education (Feenstra, Inklaar, and Timmer, 2015), as conflict can impact both. A country experiencing conflict may have fewer resources for education. Additionally, returns to education may be reduced because of economic disruptions, including loss of job opportunities. The expectation is a decrease in the human capital index will increase income inequality in most cases (Parsons, 2023). The effects of human capital on income inequality are partly determined by the dispersion of education in labor markets. The composition effect increases the wage of the smaller segment of the population with more human capital, which increases income inequality (Knight and Sabot, 1983). As the dispersion of human capital spreads more widely across a population, more of the population has higher wages, and wages compress since the supply of educated workers increases (Knight and Sabot, 1983), decreasing income inequality.

Polity data evaluates a country's regime. Conflict may be less in regimes where the government is responsive and held accountable, and citizens have a part in selecting the regime. The polity indicator ranges from (0) for strongly autocratic to (6) for strongly democratic regimes. The score is based on competitiveness, openness, political participation, and checks on executive authority. The effects of increases in democratization on income inequality are indeterminate (Olson, 1965; Acemoglu et al., 2013).

The study controls for institutional strength and quality of bureaucracy, and it is on a scale of (0) low institutional strength and bureaucracy quality to (4) high institutional strength and bureaucracy quality. Countries with better institutions and bureaucracy may have less conflict since government services have fewer disruptions. Additionally, better institutions and a quality bureaucracy can help cushion the effects of some forms of conflict. For example, although riots were at the United States Capitol, the United States Electoral College and the legislative branch prevented a larger conflict. The expectation is that increasing institutional strength and bureaucracy quality will reduce income inequality (Huber, 2002).

Trade and globalization is measured through the GDP-adjusted sum of imports and exports. Globalization and trade can lead to conflict. Trade, especially in the form of cheaper imports from multinational enterprises (MNE), affects domestic markets, which could lead to greater unemployment and subsequently cause conflict (Stiglitz, 2013). The effects of trade on income inequality are inconclusive (Heckscher, 1919; Ohlin, 1933). If economic growth through trade increases the income of low income groups disproportionately higher than higher-income groups, income inequality will decrease (Stolper-Samuelson, 1941). On the other hand, if trade increases incomes of high income groups more than low income groups, income inequality will increase.

The investment risk profile is on a scale of (0) high risk to (12) low risk and is based on the subcomponent measures of expropriation, profit repatriation, and payment delays. High investment risk can lead to conflict through its impact on the economy and foreign investment. A country with high risk, where foreign investors fear expropriation, will have less foreign investment, adversely affecting the economy. In this case, conflict can arise, and poorer economic performance may lead to higher income inequality (Alesina and Perotti, 1996).

The unemployment rate is the percentage of the labor force not working or seeking employment. Unemployment can lead to conflict (Stiglitz, 2013). Higher levels of unemployment increase income inequality since a larger percentage of the population receive no labor income (Furceri and Ostry, 2019).

The age distribution of a population affects working-class versus non-working-class percentages, leading to income inequality variations among countries (Burtless, 2009). The age dependency ratio is the percentage of people younger than 15 and older than 64 compared to the working-age population. It measures the burden of the working-age population caring for both the young and old. The larger the ratio, the greater the burden for the working class to support the young and old. Additionally, as the segment of the population outside the workforce increases, the larger the segment of the population without a working income, which increases income inequality.

The percentage of the labor force employed in manufacturing accounts for the economic structure of a country. The labor force transition from agriculture to manufacturing can decrease income inequality as low income rural households obtain higher incomes in urban manufacturing. Young (2013) finds that urban-rural income inequalities may account for 40 percent of intercountry income inequality.

3.2 Empirical framework

The study includes 106 countries in the following panels: full panel, developed countries, and developing countries. Using different panels isolates differences based on development status, and variables, such as per capita GDP, will have different relationships based on development status (Kuznets, 1955). Appendix B lists the countries in each specific panel. The data is unbalanced, with 2,744 observations in the full panel with country-level data from 1988 to 2018. Although balanced panels are preferred for analysis, the dataset is more extensive and representative, with more countries and observations. Also, more extensive country representation increases observations, and the larger sample reduces selection bias.

Model (1) borrows from Barro (2000) and Lundberg and Squire (2003), who study economic growth and income inequality determinants. The panel model regresses the net Gini coefficient on the determinants of internal conflict, external conflict, and the previously explained covariates.

$$GiniNet_{it} = \alpha + IntConf_{it} + ExtConf_{it} + X_{it} + \mu_i + \lambda_t + \varepsilon_{it} \text{ and } (i = 1, \dots, n; t = 1, \dots, T) \quad (1)$$

$GiniNet_{it}$ is the measure of income inequality for country (i) and time (t). $IntConf_{it}$ is the measure of internal conflict that varies across time and country. $ExtConf_{it}$ is the measure of external conflict that varies across time and country. X_{it} is the vector set of control variables used in the model that vary across time and countries. The parameter α contains a constant and individual-specific variable invariant over time. The μ_i captures unobservable individual-specific effects and λ_t captures unobservable time-specific effects. ε_{it} is the error term.

See Appendix D for specification testing results. Model specification analysis leads to selecting fixed effects models for both country and time. Heteroskedasticity, autocorrelation, and cross-sectional dependence are also evident in the data. To account for heteroskedasticity, autocorrelation, and cross-sectional dependence, the study uses Driscoll and Kraay (1998) standard errors which use cross-sectional averages of nonparametric standard errors to adjust for all three. The Newey-West (1987) modifications to cross-sectional averages while adjusting the standard error estimates are used to ensure the covariance matrix estimators remain consistent and independent of the cross-sectional dimensions. Although the lengths of the periods range from 18 to 31 years in this study, and Driscoll and Kraay (1998) standard errors rely on large-T asymptotics, the data set (panel) is not too short. Lags of one, three, and five years are used to account for correlations and endogeneity. Using longer lags, such as five years, analyzes the extent conflict leads to longer-lasting effects on income inequality. Pugh (2013) claims internal conflict can have an enduring impact on income inequality by reducing tax revenue, reducing funds available to redistribute, and reallocating resources from education to the military.

A potential analytical concern is the assumption of the exogeneity of conflict variables. Omitted variable bias is possible if an unobserved variable jointly determines conflict and income inequality. The issue is mitigated through the fixed effects estimations, which control for unobservable factors (Baltagi, 2001). The structure of panel data analysis accounts for omitted variables. A second potential issue is reverse causality due to the possibility of higher income inequality leading to internal and external conflicts. Although high income inequality can be synonymous with deprivation, political protest, and violence (Feirarbend and Feirarbend, 1966; Gurr, 1968; Huntington, 1968), many cross-national studies consistently find they do not increase risks of conflict (Fearon and Laitin, 2003; Collier and Hoeffler, 2004; Buhaug, et al., 2014). To eliminate this possibility, the dependent variable is lagged up to five years which mitigates the endogeneity and reverse causality issues. Selection bias is a potential issue if certain countries are underrepresented because of sparse data. The large panel sizes for developing and developed countries help reduce the problem. A tradeoff is the larger grouping reduces generalizability. For example, since the developing country panel include low income through upper middle income countries, some caution should be used when generalizing the finding across an entire panel group.

4. Results

4.1 Panel regressions

Table 4 provides three different models utilizing different groups of countries when the dependent variable is lagged 3 years. Appendix E and F does the same while changing the lag length to 1 and 5 years. The results are consistent across the models with different lags, suggesting the persistence and stickiness of income inequality (Ermisch and Smeeding, 2012; Pugh, 2013; Bircan, Brück, and Vothknecht, 2017). The results show worsening internal conflict causes an increase in income inequality in developing countries. The decrease of one unit of internal conflict, for example worsening internal conflict from (9) to (8), will increase the net Gini by (0.133) for developing countries. A one standard deviation worsening of income inequality will increase the net Gini by about (0.068). For a specific example, Cameroon has a 2018 internal conflict score of around 6, while the United States has a score near 10. If Cameroon had the United States' lower conflict level while controlling for all other variables, Cameroon's net Gini coefficient would have been lower by (0.798).

The results also show worsening internal conflict causes a statistically significant increase in the net Gini in the full and developing countries panels but not for the developed country panel. An important question is why is there a difference in statistical significance between developing and developed countries. As discussed earlier, Kuznets (1955) indicates that as developed economies grow, their income inequality declines. Consequently, developed countries have lower income inequality than developing countries (See Table 1). Furthermore, their income inequalities are close once adjusting for outliers. Finally, they have less internal conflicts than developing countries (See Table 2). Lack of internal conflict means that it cannot change income inequality. To demonstrate causality, it is necessary for the "cause" to change the "affected" or the anticipated outcome. It is clearly evident in Table 4, where none of the variables depicting different indicators of conflict are statistically significant for developed countries, even though the model, as a whole, is significant. Only "Trade and Globalization" and "Age Dependency Ratio" are statistically significant, which could be due to random outcome. In addition, developed countries tend to have better institutions and bureaucracy, which may help absorb minor internal conflict shocks. Other possibilities include that an increase in trade causes an increase in exporting and importing sectors more than other sectors, increasing income inequality.

Table 4 also provides the results of external conflict. External conflict is not statistically significant for any of the development stages. We offer two explanations for this outcome. First, although theoretically, an external conflict should adversely affect many social and economic measures of a country, and hence, income inequality, however, there are not enough of them to allow a meaningful impact on income inequality. To test this hypothesis, it is necessary to only consider cases where there are significant changes in external conflict and assess its impact. Second, much literature focuses specifically on war, while the ICRG external conflict measure considers the subfactors of diplomatic pressures, including sanctions, withholding of aid, and trade restrictions. Therefore, the distinctive differences in the measures, especially between a

cross-border war and diplomatic pressures, may also explain the statistical insignificance compared to the literature (Bircan, Brück, and Vothknecht, 2017).

Table 4. Internal and External Conflict – 3 Year Lag.

	Full Panel	Developed Countries	Developing Countries
No. in Group	106	42	64
Obs.	2,744	1,132	1,612
F	1.35e+09	5233819	1.14e+07
R ²	.234	.196	.308
Internal Conflict	-.129*** (.055)	-.120 (.130)	-.133** (.054)
External Conflict	.071* (.041)	.056 (.053)	.017 (.071)
Per Capita GDP (log)	2.23*** (.683)	-1.18 (.730)	3.47*** (.692)
Investment Profile	.005 (.035)	.074 (.050)	.015 (.047)
Political Economy	.088 (.071)	.123 (.102)	.105 (.086)
Institutional Strength and Quality of Bureaucracy	-.617*** (.147)	-.323 (.292)	-.733*** (.164)
Industry % of Economy	-.049** (.020)	.009 (.041)	-.045* (.023)
Trade and Globalization	.005 (.003)	.011*** (.003)	-.003 (.005)
Human Capital Index	-1.76*** (.492)	.570 (.378)	-3.82*** (.848)
GDP Growth Rate	.016 (.018)	.051 (.038)	.001 (.013)
Unemployed Rate	.041** (.020)	.024 (.022)	.025 (.027)
Age Dependency Ratio	.110*** (.018)	.081*** (.017)	.086*** (.015)

Note: *** p < 0.01, ** 0.01 < p < 0.05, * 0.05 < p < 0.10. Dependent variable is the net Gini coefficient. Standard Errors in parenthesis.

4.2 Results – Panel regressions with low, medium, and high internal conflict as indicator variables

The study also examines the effects of different internal conflict risk levels on income inequality. We create three groups of indicator variables based on risk categories. The categories include high risk countries with an internal conflict score between (0) to (4), the medium risk group has internal conflict between (5) to (8), and the low risk group has internal conflict between (9) to (12). Table 5 provides three different models utilizing these 3 groups when the dependent variable is lagged 3 years. The base group is the medium risk countries, and the results show the effects of a country moving from medium risk to high risk or medium risk to low risk. The results indicate a decrease in the net Gini of (0.431) when a country moves from the medium risk category to the

low risk category. The results further support the literature's claim that lower internal conflict reduces income inequality. As noted previously, the lack of statistical significance for developed countries relates to a small variance in internal conflict and income inequality after accounting for outliers. An interesting finding is the movement from medium risk to high risk is statistically insignificant. An explanation for this outcome is the distribution of internal conflict is rightward skewed, and most observations are in the medium and low risk categories. The small subset of high internal countries are outliers. See Appendix G for internal conflict distribution. Therefore, a reason for the lack of statistical significance is we are comparing the medium risk countries to a group of outliers.

Table 5. Internal conflict as high, medium, and low risk – 3 Year Lag.

	Full Panel	Developed Countries	Developing Countries
No. in Group	106	42	64
Obs.	2,744	1,132	1,612
F	1.35e+09	60857	9460780
R ²	.234	.196	.309
High Internal Conflict (Scores of 0 to 4)	-.347 (.262)	.209 (.489)	-.412 (.300)
Medium Internal Conflict (Scores 5 to 8)		Base comparison group	
Low Internal Conflict (Scores 9 to 12)	-.315** (.140)	.459 (.325)	-.431*** (.147)
External Conflict	.028 (.043)	.028 (.050)	-.021 (.076)
Per Capita GDP (log)	2.26*** (.693)	-1.13 (.710)	3.50*** (.687)
Investment Profile	.002 (.033)	.079 (.053)	.005 (.049)
Political Economy	.065 (.071)	.101 (.084)	.091 (.083)
Institutional Strength and Quality of Bureaucracy	-.632*** (.154)	-.509 (.345)	-.739*** (.166)
Industry % of Economy	-.055** (.021)	.004 (.051)	-.049* (.024)
Trade and Globalization	.005 (.003)	.011*** (.004)	-.004 (.005)
Human Capital Index	-1.71*** (.471)	.632* (.361)	-3.75*** (.811)
GDP Growth Rate	.014 (.018)	.051 (.040)	-.001 (.013)
Unemployed Rate	.045** (.019)	.030 (.021)	.035 (.027)
Age Dependency Ratio	.113*** (.018)	.087*** (.020)	.085*** (.015)

Note: *** p <0.01, ** 0.01<p<0.05, * 0.05<p<0.10. Dependent variable is the net Gini coefficient. Standard Errors in parenthesis.

5. Conclusion

The study investigates the impact of internal and external conflict on the net Gini coefficient. The study finds that worsening internal conflict causes a statistically significant increase in income inequality in developing countries, but not developed countries. The findings support Kuznets's theory (1955) that explains smaller Gini coefficients in low income developing countries, larger Gini coefficients at the intermediate levels of development, and then smaller Gini coefficients in high income developed countries. There is less internal conflict in developed countries, and developed countries have better institutional buffers, which leads to the lack of statistical significance. External conflict is not a statistically significant determinant of income inequality in developed or developing countries. The authors propose that since the ICRG external conflict measure includes nonviolent subcomponents of withholding of aid, trade restrictions, and sanctions, the broadness of the measure may partly explain the lack of statistical significance. Additionally, since there is little variation in external conflict, studies must focus on countries where external conflict changes, and then assess the effects on income inequality.

This article expands the current literature in several ways. First, as noted earlier, we find the effects of internal conflict are greater in developing countries than developed ones, a point that other studies have missed. Second, in developing countries, the study finds improvement in risk from medium to low reduces a country's income inequality. Third, it uses more comprehensive measures of conflict. The ICRG conflict data include a minimum of three subcomponents. The broadness of the conflict measures has advantages and disadvantages. The benefit is analyzing a more extensive set of factors of conflict. The broader lens of conflict improves the breadth and depth of the internal and external conflict measures. On the other hand, the broader measures limit the generalizability of specific subfactors. Thus, it could be the case that civil war matters, but civil disorder matters less. Alternatively, cross-border wars matter, but diplomatic pressures do not matter as much. In other words, as the subcomponents of each internal or external conflict measure get compiled into one overall rating, one needs to be thoughtful and careful with generalizations. The fallacy of division would lead to a faulty conclusion that because the broader external conflict measure is statistically insignificant, each of the three subcomponents must also be insignificant. Additionally, it is a mistake to conclude that since the internal conflict measure is statistically significant for developed countries, it must mean all three subcomponents are significant, as well.

Other contributions to the literature include the model. It accounts for cross-sectional dependence, which may cause biased estimators in cross-national income inequality studies. The research also includes important covariates, such as the dependency ratio, which is missing in some models in the literature. The study also includes recent data and covers the last 30 years in 106 countries.

The researchers note the limitations of the study. Potential omitted-variable bias exists, but the two-way fixed effects and the panel data structure mitigate the problem. Missing data and selection bias always cause some concern, but it is mitigated through the panel structure and

examining groups based on development status. Future research should explore other mechanisms which affect income inequality through conflict and stability. Also, measures isolating the three subcomponents of internal and external conflict could lead to important insights.

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Appendix A. Summary Statistics

Variable	Source	Observ.	Mean	St. Dev.	Min	Max
Net Gini Coefficient	SWIID	2,744	38.12	8.81	19.5	66.5
External Conflict	ICRG	2,744	10.2	1.56	2	12
Internal Conflict	ICRG	2,744	9.02	2.05	0	12
Age Dependency Ratio	World Bank	2,744	61.9	18.1	27.0	117
Employment in Manufacturing	World Bank	2,744	21.6	7.85	2.54	46.0
GDP Growth Rate	World Bank	2,744	2.23	4.09	-40.7	24.0
Human Capital Index	Penn World Tables (10.0)	2,744	2.52	.700	1.05	3.97
Imports + Exports % GDP	World Bank	2,744	77.8	50.74	11.1	437.3
Investment Risk Profile	ICRG	2,744	7.94	2.31	0	12
Natural Log of GDP Per Capita	World Bank	2,744	8.68	1.49	5.21	11.6
Quality of Bureaucracy and Institutions	ICRG	2,744	2.4	1.10	0	4
Unemployment Rate	World Bank	2,744	8.27	6.33	.1	38.8

Appendix B. Panel list, by country

Full panel: Albania, Algeria, Angola, Argentina, Armenia, Australia, Austria, Bangladesh, Belgium, Bolivia, Botswana, Brazil, Brunei, Bulgaria, Burkina Faso, Cameroon, Canada, Chile, China, Columbia, Costa Rica, Cote d'Ivoire, Croatia, Cyprus, Czechia, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Finland, France, Gambia, Germany, Ghana, Greece, Guatemala, Guyana, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iran, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Latvia, Lithuania, Luxembourg, Madagascar, Malawi, Malaysia, Mali, Mexico, Moldova, Mongolia, Morocco, Mozambique, Namibia, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Romania, Russia, Senegal, Sierra Leone, Singapore, Slovakia, Slovenia, South Africa, South Korea, Spain, Sri Lanka, Sudan, Sweden, Switzerland, Tanzania, Thailand, Tunisia, Turkey, Uganda, Ukraine, United Kingdom, United States, Uruguay, Venezuela, Yemen, Zambia, Zimbabwe. **Developed Countries:** Australia, Austria, Belgium, Brunei, Canada, Chile, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Hungary, Iceland, Ireland, Israel, Italy, Japan, Latvia, Lithuania, Luxembourg, Netherlands, New Zealand, Norway, Poland, Portugal, Qatar, Romania, Singapore, Slovakia, Slovenia, South Korea, Spain, Sweden, Switzerland, United Kingdom, Uruguay, and United States. **Developing Countries:** Albania, Algeria, Angola, Argentina, Armenia, Bangladesh, Bolivia, Botswana, Brazil, Bulgaria, Burkina Faso, Cameroon, China, Columbia, Costa Rica, Cote d'Ivoire, Dominican Republic, Ecuador, Egypt, El Salvador, Gambia, Ghana, Guatemala, Guyana, Honduras, India, Indonesia, Iran, Jamaica, Jordan, Kazakhstan, Kenya, Madagascar, Malawi, Malaysia, Mali, Mexico, Moldova, Mongolia, Morocco, Mozambique, Namibia, Nicaragua, Niger, Nigeria, Pakistan, Paraguay, Peru, Philippines, Russia, Senegal, Sierra Leone, South Africa, Sri Lanka, Sudan, Tanzania, Thailand, Tunisia, Turkey, Uganda, Ukraine, Venezuela, Yemen, Zambia, and Zimbabwe.

Appendix C – Correlation Matrix

	Internal Conflict	External Conflict	GDP Per Capita	Depend. Ratio	Invest. Profile	Employed Industry%	Imp + Exp (% GDP)	Human Capital	GDP Growth	Unempl.
Internal Conflict	1.00									
External Conflict	.568	1.00								
GDP Per Capita	.500	.260	1.00							
Depend. Ratio	-.412	-.197	-.726	1.00						
Invest. Profile	.411	.218	.524	-.399	1.00					
Employed Industry%	.352	.184	.596	-.679	.213	1.00				
Imp + Exp % GDP	.320	.188	.298	-.322	.298	.170	1.00			
Human Capital	.461	.202	.817	-.781	.496	.549	.274	1.00		
GDP Growth	.082	.019	-.039	-.141	.096	.048	.100	.038	1.00	
Unempl.	-.087	-.004	-.032	.040	-.117	.012	-.071	-.058	-.136	1.00

Appendix D. Specification testing

1. Hausman test for fixed versus random effects=Fixed Effects
2. Joint test for time fixed-effect=Indicator variable for time.
3. Wald test for heteroscedasticity = Presence of heteroskedasticity
4. Pesaran (CD) test for cross-sectional dependence = Presence of cross-sectional dependence
5. Woolridge test for autocorrelation = Presence of autocorrelation
6. Variance inflation factor (VIF) test for multicollinearity=1.87

Appendix E. Table 2. Internal and external conflict – 1 year lag

	Full Panel	Developed Countries	Developing Countries
No. in Group	106	42	64
Obs.	2,744	1,132	1,612
F	4.99e+09	239496	2.11e+07
R²	.234	.200	.301
Internal Conflict	-.129*** (.044)	-.120 (.108)	-.134*** (.043)
External Conflict	.071* (.037)	.056 (.047)	.017 (.064)
Per Capita GDP (log)	2.23*** (.526)	-1.18* (.628)	3.43*** (.562)
Investment Profile	.005 (.030)	.074 (.045)	.015 (.041)
Political Economy	.088 (.055)	.123 (.098)	.105 (.066)
Institutional Strength and Quality of Bureaucracy	-.617*** (.119)	-.323 (.266)	-.733*** (.133)
Industry % of Economy	-.049*** (.015)	.009 (.041)	-.045*** (.019)
Trade and Globalization	.005* (.003)	.011*** (.003)	-.004 (.004)
Human Capital Index	-1.76*** (.382)	.570* (.317)	-3.81*** (.669)
GDP Growth Rate	.016 (.017)	.051 (.037)	.001 (.013)
Unemployed Rate	.041** (.016)	.024 (.018)	.025 (.024)
Age Dependency Ratio	.110*** (.015)	.081*** (.017)	.086*** (.012)

Note: *** $p < 0.01$, ** $0.01 < p < 0.05$, * $0.05 < p < 0.10$. Dependent variable is the net Gini coefficient. Standard Errors in parenthesis.

Appendix F Internal and external conflict – 5 year lag

	Full Panel	Developed Countries	Developing Countries
No. in Group	106	42	64
Obs.	2,744	1,132	1,612
F	1.10e+09	913616	1.68e+07
R²	.234	.196	.308
Internal Conflict	-.129*** (.055)	-.120 (.138)	-.133** (.058)
External Conflict	.071* (.040)	.056 (.052)	.016 (.071)
Per Capita GDP (log)	2.23*** (.746)	-1.18 (.720)	3.47*** (.745)
Investment Profile	.005 (.034)	.074 (.049)	.015 (.042)
Political Economy	.088 (.079)	.124 (.093)	.105 (.094)
Institutional Strength and Quality of Bureaucracy	-.617*** (.166)	-.323 (.271)	-.733*** (.187)
Industry % of Economy	-.049** (.022)	.009 (.051)	-.045 (.027)
Trade and Globalization	.005 (.003)	.011*** (.004)	-.003 (.005)
Human Capital Index	-1.76*** (.835)	.570 (.378)	-3.82*** (.939)
GDP Growth Rate	.016 (.017)	.051 (.037)	.001 (.011)
Unemployed Rate	.041** (.020)	.024 (.024)	.026 (.026)
Age Dependency Ratio	.110*** (.020)	.081*** (.022)	.086*** (.017)

Note: *** $p < 0.01$, ** $0.01 < p < 0.05$, * $0.05 < p < 0.10$. Dependent variable is the net Gini coefficient. Standard Errors in parenthesis.

Appendix G. Internal conflict distribution

