When does self-employment equalise income? Evidence from developing countries.

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Abstract

Aim: A lack of sufficient gainful employment opportunities in developing countries means that those at the bottom of the income ladder resort to self-employment for survival. While self-employment equalises inequality by providing earning opportunities to such individuals due to the ease of entry, it also creates a competitive environment among the self-employed, consequently widening inequality. In light of this, the study aims to determine the optimal level at which self-employment narrows inequality.

Methodology: Five-yearly average data from 72 developing countries covering 2000-2019 is used. Inequality measures include Gini, and self-employment includes total, male and female participation levels. The empirical analysis is based on the dynamic two-step system GMM estimation approach, two-stage instrumental variables (2 SLS IV) approach and Sasabuchi (1980) and Lind and Mehlum (2010) test. Several robustness checks are used to validate the findings.

Findings: Prima facie, the study's findings suggest that self-employment equalises inequality in developing countries. The income-equalising effect can be seen, however, when the total, male, and female self-employment levels are below the optimal of 54.22 per cent of total employment, 52.50 per cent of male employment, and 54.19 per cent of female employment, respectively. Inequality widens when self-employment exceeds these optimal levels. Further, the income-narrowing effect of self-employment is larger than its income-widening effect. When self-employment is below its optimal level, it reduces inequality 80 times more effectively than when it widens above the optimal levels. The corresponding figures for male and female self-employment are 90 and 52, respectively. Second, the income-equalising effects of self-employment are gender-specific.

Policy implications: Developing countries striving to achieve SDG 10 should limit self-employment to the abovementioned levels. To this end, an inclusive approach to reducing inequality requires these countries to use selective and targeted policy interventions to create gainful employment opportunities for those above the identified optimal levels and eventually assist them in utilising these opportunities.

Originality: To the best of my knowledge, this is the first study to determine the optimal levels at which self-employment equalises income in developing countries. As such, it makes novel contributions to both labour and development economics.

Keywords: self-employment, inequality, developing countries, dynamic panel data, Sasabuchi, Lind and Mehlum

JEL classification: D63, E24, J21

Introduction

Income inequality (inequality) is a pervasive and deeply rooted issue (Papageorgiou *et al.*, 2008, Piketty *et al.*, 2014, Dabla-Norris *et al.*, 2015). This is because inequality is found to have unintended consequences on human capital (Wilkinson, 1992, Lynch *et al.*, 2001), socio-political environment (Alesina and Perotti, 1996, Rodrik, 1999, Rothstein and Uslaner, 2005) and economic growth (Persson and Tabellini, 1994, Perotti, 1996, Ostry *et al.*, 2014). Consequently, what drives inequality has been of interest to both economists and policymakers[1]. No wonder Sustainable Development Goal (SDG) 10 aims to reduce inequality within and between countries (ESCAP, 2019, United Nations, 2018).

Another pervasive challenge confronting developing countries is growing levels of self-employment. According to the World Bank (2022), self-employment includes the four subcategories of own-account workers, employers, producer cooperatives, and contributing family workers. In the context of developing countries, self-employment is a pervasive challenge as it is not the same as entrepreneurial activity, which creates jobs and adds millions of new consumers to the marketplace and stimulates trade and economic development. It is neither informal[2]. Instead, self-employment is the most common method of employment that people at the bottom of the income ladder resort to in order to remain afloat. Even though self-employment provides a way of life for individuals who otherwise would have no alternative means of subsistence, the growing concern regarding self-employment in developing countries is specifically related to its meagre earnings. It is not surprising that self-employment has traditionally been associated with the poor in developing countries (Fields, 2019). Figure 1 illustrates the trend in self-employment in developing countries over time.

In the context of developing countries, both inequality and self-employment are intrinsically linked since they both concern individuals at the bottom of the income strata. The very nature of self-employment appears to equalise incomes because it provides earning opportunities to those at the bottom of the income spectrum who would otherwise not have the opportunity to earn a living. However, the very nature of their work as suppliers of goods and services to low-end markets where they barely earn a living and the ease with which unemployed workers can enter this form of employment contribute to the rise of competition among self-employed. The competition, in turn, erodes self-employed's earnings, which are modest to begin with, and eventually widens inequalities. Consequently, high reliance on self-employment may serve to widen and reinforce inequalities rather than narrow them. Growing evidence of self-employment levels[3] and widening inequalities[4] in developing countries also provides support to this assertion. In the event that a high dependence on self-employment reinforces inequality, it can impede the efforts of the developing countries in their efforts to achieve SDG 10 while also defeating their efforts to provide decent work for all (SDG 8). Hence, two issues are worth examining from the redistribution policy perspective. First, what is the optimal level at which self-employment equalises income? Are these optimal levels gender-specific?

In addressing the above questions, this study makes several contributions to the literature. First, several studies on inequality have also examined the consequences of inequality on socioeconomic indicators (Wilkinson, 1992, Lynch *et al.*, 2001, Alesina and Perotti, 1996, Rodrik, 1999, Rothstein and Uslaner, 2005, Persson and Tabellini, 1994, Ostry *et al.*, 2014). In light of the unintended consequences that inequality has, several other studies have also examined what drives inequality (Barro, 2000, Law and Soon, 2020, Rodgers, 1983, Anderson *et al.*, 2017, Sidek, 2021, Reuveny and Li, 2003, Beck *et al.*, 2007). To the best of my knowledge, this study is the first to examine the optimal levels at which self-employment

equalises income. For this purpose, the study has used data from 72 developing countries from 2000 to 2019. The data analysis is based on the dynamic panel data techniques and Sasabuchi (1980) and Lind and Mehlum (2010) tests. This study specifically focuses on identifying optimal levels are which are of immense importance to policymakers and practitioners alike in achieving SDG 8 and SDG 10. Second, this study also contributes to the small yet growing literature on self-employment in the context of developing countries (Yerrabati, 2021, 2022b, Fields, 2019, Narita, 2020). By examining the relationship between self-employment and inequality, this study adds a new dimension to the literature on the role of self-employment in addressing the issue of inequality.

The findings of this study indicate that self-employment equalises income in developing countries. Nevertheless, such effects are only possible when self-employment levels are below a certain optimal level. With regard to total self-employment levels, inequality can be narrowed when self-employment is below 54.3 per cent of total employment. The corresponding figures for male and female self-employment are 52.50 per cent and 54.19 per cent, respectively. Thus, in situations where there are not enough opportunities for gainful employment, self-employment up to these optimal levels act to narrow inequalities. Nevertheless, when the levels of self-employment cross these optimal levels, they tend to widen inequality. Therefore, from a redistributive perspective, the proliferation of self-employment in developing countries beyond these optimal levels should be a cause of concern. A corollary to this finding is that the income-equalising effects of self-employment below the optimal levels are larger than their widening effects above the levels. Specifically, when self-employment is below its optimal level, it reduces inequality 80 times more effectively than when it widens above it. The corresponding figures for male and female self-employment are 90 and 52, respectively. In this regard, developing countries seeking to substantially reduce inequality should use targeted and selective interventions to limit self-employment to these optimal levels and move those above these optimal levels into gainful employment. The second notable contribution of the study is the finding that the income-equalising effects of self-employment are gender-specific. In particular, below the above-identified optimal levels where self-employment equalises inequality, the income-equalising effects of female self-employment are lower than those of their male counterparts. This finding, broadly in line with the literature on the subject (Yerrabati, 2022b), illustrates the predicament of women workers in this form of employment. It also gains significance when considered in light of the efforts of the developing countries toward achieving SDG8 and SDG10.

Theoretical underpinnings
To the best of my knowledge, the existing literature does not provide direct theoretical or empirical evidence regarding the mechanisms or channels through which self-employment affects inequality. Nevertheless, based on the broader literature on labour markets and inequality (Fields, 2019, ILO, 2010, Narita, 2020, Yerrabati, 2022b, 2022a, 2021, OECD/ILO, 2019), the underpinning of this study is that self-employment reduces inequality up to an optimal level, after which it can widen it. This can be articulated as follows. Let us assume that workers in an economy are divided into unemployed, self-employed, and wage employed. For simplicity, let us also assume that the earnings of unemployed individuals are zero, self-employed individuals earn more than unemployed individuals, and wage earners earn the highest earnings. Additionally, owing to the lack of sufficient employment opportunities in developing countries (Fields, 2019) and the skills and experience needed for such opportunities, it is assumed that the unemployed cannot easily find gainful employment.

Assuming that individuals are utility maximising and that they make rational choices (Rottenberg, 1956), they prefer self-employment over unemployment. In other words, as Fields (2019) notes, in the absence of alternative sources of income and a comprehensive social safety net to safeguard against economic shocks, individuals in developing countries self-employ themselves and others in their households. Self-employment in these countries typically involves the production of goods and services that are primarily subsistence in nature and require little to no skill. These workers usually operate in low-end markets, which, as Karnani (2005) noted, remain largely untapped by multinational corporations. Additionally, these workers also produce inputs for larger firms through outsourcing and disguised forms of employment.

Regardless of the market they serve, in the absence of alternative sources of income, by providing a means to earn income, self-employment reduces the share of the poor, thereby narrowing the income gap or decreasing the Gini index[5]. Self-employment, however, does not present the same barriers to entry and exit as wage employment, such as skill requirements or start-up costs and as such, it attracts a large share of unemployed workers. Importantly, self-employment is preferable to unemployment for poor individuals, as it provides them with some income without preventing them from searching for gainful employment. However, as more self-employed enter the market, at some point, an increased share of workers in self-employment saturate the market for a particular good or service. In turn, this results in a reduction in the earnings of these workers and an increase in the number of poor, thereby widening the income gap or increasing the Gini index.

To illustrate, let us imagine a bespoke garment stitching market where self-employed garment stitchers rely on garment stitching to make ends meet. Despite the painstaking effort they put in, the limited number of customers they have in the market means that they earn meagre wages. The fact remains, however, that when they engage in garment stitching, they earn income for themselves and their families. So long as the number of garment stitchers in the market remains high enough to permit each one to earn a living, their household income increases. Increased household income reduces the share of those at the bottom of the income distribution, thus lowering inequality or the Gini index.

Starting a garment stitching business, however, does not pose a particular challenge in developing countries. The cost of starting a garment stitching business is not high since it does not require a commercial space, as the majority of them operate their businesses from their homes. In addition, the business does not entail high labour costs, as the necessary labour support can be provided by family members, including stitching. As a result of the minimal knowledge and cost required to start a business, more and more unemployed workers may find it an effective way to make ends meet. With an increasing number of garment stitchers entering the market, competition becomes stiffer. This leaves each garment stitcher with a smaller portion of customers, which they may not be able to retain without lowering prices or providing additional services. This, in turn, can have an unintended effect on the earnings of these workers and their household income. Thus, an increase in the number of garment stitchers at some point swells the number of low-income earners and widens inequality levels in the economy. Therefore, self-employment has an income-equalising effect when fewer people engage in it or when self-employment levels in an economy are below a certain optimal level. Inequality widens as more individuals become self-employed or as the level of self-employment exceeds the optimal level. Pertinent to note that, using the ILO's country classification system, Fields (2019) explains that self-employment varies inversely with economic development within countries[6]. Accordingly, as self-employment decreases with economic development, its effects on inequality will diminish.

A corollary to the above discussion is that although self-employment can reduce inequality, it is important to note that its effects are likely to vary according to gender. Even though self-employment is prevalent among both men and women (Fields, 2019), evidence suggests that while the majority of men remain as own-account workers who receive compensation, the majority of women remain unpaid contributing workers (ILO, 2010, Jayachandran, 2020). Socio-cultural norms in these countries dictate that monetary compensation is received by the male member of the family who holds a position of authority within the family. Consequently, as women do not receive direct compensation for their work, increased self-employment among women may not result in the same reduction of inequality as it does among their male counterparts. In effect, the impact of female self-employment on reducing inequality may be lower than their male counterparts.

To the best of my knowledge, however, empirical evidence supporting these assertions is lacking, which is what this study is trying to address. The rest of the study is organised as follows. The next section outlines the methodology employed by the study. A discussion of the empirical findings follows this. The paper ends with relevant policy implications.

Section 2: Methodology
2.1 Model specification

To find out when self-employment narrows inequality, the following non-linear dynamic panel data model will be used.

$$gini_{it} = \vartheta + \gamma_1 gini_{i(t-1)} + \gamma_2 self_{it} + \gamma_3 self_{it}^2 + \gamma_4 gdp_{it} + \gamma_5 gdp_{it}^2 + \gamma_6 x_{it} + \xi_t + \eta_i + \nu_{it} \ (1)$$

Where $gini_{it}$ denotes the natural logarithm of the estimate of the Gini index in equivalized household market income in country i and year t. Equation (1) is dynamic in nature, as the current levels of $gini_{it}$ are influenced by their previous value, i.e., $gini_{i(t-e)}$ (Durlauf, 1996). $self_{it}$ and $self_{it}^2$ represent the linear and non-linear terms of self-employment that will be used to find out when self-employment narrows inequality. The presence of both negative and positive coefficients on the linear and non-linear terms of self-employment suggests that self-employment lowers inequality at lower levels but widens it at higher levels and vice versa. gdp_{it} and gdp_{it}^2 are used to test the presence of Kuznets (1955) inverted U-shaped, which remains inconclusive (Barro, 2000, Ahluwalia, 1976, Deininger and Squire, 1998). x_{it} is the vector of explanatory variables. ξ_t represents the time-specific effect; η_i is the country-specific effect; ν_{it} is the error term.

As $gini_{i(t-1)}$ is positively associated with η_i, Ordinary Least Squares (OLS) estimate of $gini_{i(t-e)}$ will be biased upwards, and the Fixed Effects Estimation (FEE) will be biased downward (Arellano and Bond, 1991). To overcome the above issues, Arellano and Bond (1991) suggested using difference GMM. The approach differences equation (1) to remove η_i and then all lagged values as used as instruments. The difference equation can be expressed as below:

$$\Delta gini_{it} = \gamma_1 \Delta gini_{i(t-1)} + \gamma_2 \Delta self_{it} + \gamma_3 \Delta self_{it}^2 + \gamma_4 \Delta gdp_{it} + \gamma_5 \Delta gdp_{it}^2 + \gamma_6 \Delta x_{it} + \Delta \xi_t + \Delta \nu_{it} \ (2)$$

Following the limitations associated with the first-differences GMM (Blundell and Bond, 1998), the study uses the system GMM approach proposed by Arellano and Bover (1995) and Blundell and Bond (1998). The method is based on two equations - the first difference and the equation of levels, which makes it superior to the other methods. The system GMM approach is available in two variants - one- and two-step. Due to its inherent benefits, this study uses the two-step system GMM approach (Arellano and Bond, 1991, Blundell and Bond, 1998). The asymptotic standard errors in the two-step variant will be accounted for by Windmeijer (2005) corrected standard errors. The consistency of the GMM estimates is tested using the Arellano-Bond test for no second-order serial correlations in the error term and the Hansen test to test the overidentifying restriction. Following Roodman (2009), instrument proliferation is addressed by collapsing the instrument set.

The non-linear relationship between self-employment and inequality obtained in equation (1) is validated using the Sasabuchi (1980) and Lind and Mehlum (2010) tests. Lind and Mehlum (2010) have argued that non-linear relationships cannot be concluded merely based on the coefficients of the linear and the non-linear terms. For, the genuine relationship between the variables can be convex but monotone. The null hypothesis for the test is: $H_0: [(\gamma_2 + 2\gamma_3 self_{min} \leq 0) \; and \; (\gamma_2 + 2\gamma_3 self_{max} \geq 0)]$ which can be rejected in favour of the alternate hypothesis, $H_1: [(\gamma_2 + 2\gamma_3 self_{min} > 0) \; and \; (\gamma_2 + 2\gamma_3 self_{max} < 0)]$. Where, $self_{min}$ and $self_{max}$ represent the minimum and the maximum values of self-employment, respectively.

One issue in examining the relationship between self-employment and inequality arises due to the endogeneity between self-employment and inequality, as they both refer to the people at the bottom of the income ladder. Hence, the causation can run from self-employment to inequality or inequality to self-employment. In other words, people might be self-employed because they are at the lower end of the income strata, or they might be at the lower end of the income strata due to the meagre earnings they make from self-employment. In order to address this issue and demonstrate the causal relationship going from self-employment to inequality, all variables on the right-hand side of equation (1) are lagged by one period.

$$gini_{it} = \vartheta + \gamma_1 gini_{i(t-1)} + \gamma_2 self_{it-1} + \gamma_3 self_{it-1}^2 + \gamma_4 gdp_{it-1} + \gamma_5 gdp_{it-1}^2 + \gamma_6 x_{it-1} + \xi_{t-1} + v_{it-1} \; (3)$$

2.2 Data and sources

The data set comprises 72 developing countries from 2000 to 2019. This sample includes countries that have both data on inequality and on self-employment. The table in the Appendix provides a list of these countries. All data is transformed into five-year averages to prevent short-term fluctuations in the data. Averaging the data does not result in a loss of information since inequality is stable over time. Table 1 in the Appendix lists variables, their definitions, and data sources for the study. The sample countries are listed in Table 2 in the Appendix. The dependent variable is the Gini index of inequality in equivalized household market income. A higher value of the index indicates greater inequality and vice versa. In developing countries where formal employment is rare, both men and women engage in self-employment (ILO, 2010). The use of total self-employment, in conjunction with both male and female self-employed levels, will also allow us to examine gender-related differences in inequality.

In addition to the gross domestic product per capita that is used to test Kuznets (1955)'s hypothesis, several control variables are used in the analysis. Following the extant literature, education (Lee and Lee, 2018, Beck *et al.*, 2007), trade (Reuveny and Li, 2003), foreign direct investments (Reuveny and Li, 2003), financial development (Beck *et al.*, 2007) and democracy (Reuveny and Li, 2003) are expected to narrow inequality. In contrast, inflation (Law and Soon, 2020, Siami-Namini and Hudson, 2019) and population (Rodgers, 1983) are expected to widen inequality. Empirical evidence on the effects of government spending (Anderson *et al.*, 2017, Sidek, 2021) and aid (Easterly *et al.*, 2004, Burnside and Dollar, 2000) remain inconclusive.

Section 3: Findings and analysis
3.1 Summary statistics and correlation

The summary statistics presented in Table 3 indicate that the Gini coefficient's mean value is 47.30, with a standard deviation of 7.07. The mean values of the total, male and female self-employment are 53.20, 50.81 and 56.21, respectively, suggesting that self-employment levels are high in developing countries. Table 4 presents a correlation matrix which indicates a significant negative correlation between inequality and three forms of self-employment. Correlation matrix analysis does not reveal any severe multicollinearity issues, which is also confirmed by variance inflation factor analysis.

3.2 Regression analysis

Table 5 presents regression results analysed using the two-step system GMM estimation approach. The corresponding columns 1, 2 and 3 present the estimation results involving total, male and female self-employment levels. All three estimations passed the Hansen test of over-identification restrictions and the Arellano-Bond test for second-order serial correlation, demonstrating that the instruments employed in the estimation were valid and free from serial correlation. The results of the two tests are reported at the bottom of the table. In all three models, the coefficient of the lagged dependent variable is positive and statistically highly significant, suggesting that inequalities persist (Durlauf, 1996).

Based on columns 1 - 3 of table 5, it appears that total, male, and female self-employment significantly impacts inequality. At a 5 per cent level of significance, the coefficients of the linear and squared terms of self-employment in column 1 are -0.080 and 0.001, respectively. In other words, a one per cent increase in self-employment at lower levels is associated with a fall in the inequality index by 0.080 units. In contrast, at higher levels, the same one per cent increase in self-employment is associated with a rise in inequality by 0.001 units. Similarly, the coefficients of the linear and squared terms for male self-employment in column 2 are -0.090 and 0.001, both statistically significant at a significance level of 5 per cent. Finally, the corresponding figures for female self-employment are -0.052 and 0.001, respectively, both of which are significant at a 5 per cent level of significance. In principle, the presence of a negative linear coefficient accompanied by a positive squared coefficient in each of the three estimations suggests that self-employment and inequality are related in a non-linear or U-shaped manner. Thus, the above figures indicate that while self-employment tends to narrow inequality at a low level, it does the opposite at a higher level.

The Sasabuchi (1980) and Lind and Mehlum (2010) test results are presented at the bottom of Table 5. Based on the p-values of 0.01 in column 1, 0.01 in column 2, and 0.02 in column 3, it can be confirmed that the relationship between self-employment and inequality is indeed non-monotone and U-shaped in nature. According to column 1 of Table 5, the optimal value for total self-employment is 54.22, with a 95 per cent confidence interval of 22.69 per cent to

67.56 per cent. Therefore, an increase in self-employment up to the optimal level of 54.22[7] per cent is associated with a reduction in inequality. Nevertheless, any further increase in the number of self-employed individuals above the optimal level is associated with increased inequality. In column 2, the corresponding figure for male self-employment is 52.50 per cent, with a confidence interval of 25.63 per cent and 66.52 per cent. Finally, the optimal level for female self-employment in column 3 is 54.19 per cent, with a confidence interval of 11.93 per cent to 71.21 per cent.

Following the above analysis, two important contributions of the study can be noted. Firstly, self-employment in developing countries reduces inequality, even if only by a very small amount. However, the inequality-narrowing effects of self-employment can be observed only when the total, male, and female levels of self-employment are below optimal levels of 54.22 per cent of total employment, 52.50 per cent of male employment, and 54.19 per cent of female employment, respectively. An increase in self-employment levels beyond these optimal levels is associated with widening inequality. In other words, when there are not enough gainful employment opportunities available, self-employment at its best can narrow inequality by a minuscule amount up to the abovementioned optimal levels. However, this effect disappears once self-employment levels pass these levels. The corollary of the above finding is that the magnitude of the effect of the linear term is greater than that of the non-linear term. For instance, from column 1 of Table 5, it can be noted that the coefficient of the linear term is 0.080, while the squared term is 0.001. In other words, increasing total self-employment in developing countries below the optimal level is 80 times more effective in reducing inequality than its widening effect above the optimal level. Likewise, the reduction in inequality associated with male self-employment below the optimal level is 90 times greater than its widening effect associated with self-employment above the optimal level. The corresponding figure for female self-employment is 52. In line with the previous observation, these figures underscore the need to limit self-employment to the above-identified levels in order to substantially reduce inequality in developing countries.

The second contribution relates to the differential effects of both male and female self-employment on narrowing inequalities. Even though the inequality-widening effects of male and female self-employment above the previously identified optimal levels remain equal (0.001), this is not the case with the inequality-narrowing effects below the levels. According to columns 2 and 3 of Table 5, the coefficient of the linear term for male self-employment is -0.090, whereas the linear term for female self-employment is -0.052. Essentially, this implies that the effectiveness of male self-employment appears to be 0.73 times greater than that of female self-employment in reducing inequalities. This finding, however, should be interpreted with caution as the estimates do not imply that female self-employment cannot be used as an effective policy tool in narrowing inequalities. Neither the finding implies that female workers put in less effort in this type of employment nor that they are innately less capable of reducing inequality. Rather, this finding indicates that if developing countries seek to substantially reduce inequality, male self-employment should take precedence over female self-employment. Importantly, this finding also highlights the plight of female workers, who, despite putting in strenuous effort into this form of employment, both as a result of the nature of the work and as a consequence of family and childcare responsibilities, their efforts are not translating into the same level as male workers.

Following the extant literature on the labour markets, several possible reasons can be outlined why this might be the case. One possible reason for this could be that more females are employed as contributing family workers who are more often than not expected to support their male counterparts without pay. This is in contrast to the male workers who seldom take

the role of own-account workers and receive the payment (ILO, 2010, Jayachandran, 2020). In spite of the contribution female workers make to the economic activities of businesses as contributing family workers, the financial results of such activities are often not attributed to them directly. Consequently, although more female workers are into self-employment, their effect on narrowing inequality remains lower than their male counterparts. Further, even if female workers are financially compensated, the persistent gender wage gap in the labour markets means that they are often paid lower wages than male workers. The OECD/ILO (2019) found that female workers in informal employment face a double wage disadvantage - on average, informal workers are paid lower wages than formal workers, and female workers are paid lower wages than male workers. Another possible explanation for the lower effects could be that female workers are disproportionately burdened with household responsibilities such as caring for children and elderly family members (ILO, 2010, Beneria, 1981). In view of such responsibilities, while male employees are able to devote more time and effort to self-employment, it is possible that female workers are restricted in their abilities. Consequently, although more female workers engage in self-employment, their overall contribution to lowering inequality remains lower than that of their male counterparts.

In terms of the control variables, Table 5 suggests no evidence to support Kuznets (1955) hypothesis. In light of the inconclusive nature of the relationship (Barro, 2000, Ahluwalia, 1976, Deininger and Squire, 1998), this finding is not surprising. Contrary to the extant literature (Lee and Lee, 2018, Beck *et al.*, 2007), education has positive and statistically significant effects on inequality in all three models. Thus, secondary school education in developing countries benefits the rich more than the poor. Expectedly, an increase in the urban population is associated with a decline in inequality. Perhaps, individuals living in urban areas have more and better opportunities to earn and thus narrowing the inequalities. Contrary to the arguments made by Reuveny and Li (2003), FDI benefits the rich more than the poor as it has consistently positive and significant effects in all three columns (0.001). One possible reason for this could be that FDI in developing countries creates a demand for skilled workers who are non-poor and thereby increasing inequality. These findings need policy attention in light of the significant and comprehensive reforms that developing countries undertook to attract FDI.

Concurring with the views of Beck *et al.* (2007), improvements in financial development have inequality-narrowing effects in all three columns. Thus, policy interventions to narrow inequality in developing countries should improve their financial development. Government spending and trade have insignificant effects in all three estimations, implying that improvements in these variables did not matter for inequality in the context of developing countries. Although Reuveny and Li (2003) found democracy to reduce inequality, it has an insignificant effect in developing countries. Similarly, inflation has an insignificant effect, suggesting it does not hurt the poor and widens inequalities. These findings are not surprising because of the inconclusive relationship between inflation and inequality (Siami-Namini and Hudson, 2019, Law and Soon, 2020).

3.3 Robustness check

The findings obtained in Table 5 are validated using two robustness checks[8]. The first test involved using an alternate measure of inequality, i.e., an estimate of the Gini index of inequality in equivalized household disposable income. The second test involved using the two-stage Instrumental Variables (IV 2SLS) approach, which requires an instrument set W that satisfies exclusion and relevance criteria. The exclusion criteria require instruments to be independent of the unobservable factors that affect inequality. Thus, $cov(W, v|x) = 0$. W

must be related to the explanatory variables that cause endogeneity to satisfy the relevance criteria. Thus, $cov\,(self, W|x) = 0$.

Following the earlier studies, the rule of law, labour regulations and ethnolinguistic fractionalisation are used as instruments. The law can have important implications on how the labour market works and eventually affect the size of self-employment (Djankov and Ramalho, 2009). Similarly, tighter labour market regulations can affect the number of employment opportunities created (Bertola, 1990, Stähler, 2008) and result in a sharp rise in informal employment. Finally, increased ethnolinguistic fractionalisation results increase in the integration among the ethnic groups. Eventually, individuals from other backgrounds experience unfavourable treatment in finding jobs. Subsequently, such individuals can be forced to resort to self-employment (Karnane and Quinn, 2019). The validity of these instruments is checked using the Kleibergen-Paap rk LM statistic, Kleibergen-Pasp rk Wald F statistic, Hansen J statistic and the Endogeneity test of endogenous regressors. All instruments used in the IV approach are validated using the Kleibergen-Paap rk LM statistic, Kleibergen-Pasp rk Wald F statistic, Hansen J statistic and the Endogeneity test of endogenous regressors. The findings obtained in Table 5 remain intact to these checks suggesting that the results are neither driven by the choice of variable nor the estimation approach used.

3.4 Sub-sample analysis

To further validate the findings in Table 5, two sub-sample analyses are conducted[8]. First, the list of countries included in the sample comprises different regions (see Table 2). It is, therefore, possible that countries from one or more of these regions are driving the overall results. To check this proposition, a sub-sample analysis is conducted for each form of self-employment by removing countries from each region listed in Table 2 one at a time from the overall sample. The overall findings of Table 5 remain unchanged when countries from EAP, ECA, MENA and SA regions are excluded from the sub-sample for total and female self-employment levels. Nonetheless, the overall results did not remain intact when LAC and SSA region countries were excluded from the analysis, suggesting that these regions may have contributed to the overall findings.

Second, the sample of countries included in the study is also made up of a mixture of countries with varying degrees of self-employment. Some countries, such as Benin, Central African Republic, Mozambique, Niger, Sierra Leone, and Tanzania, have total self-employment levels as high as 90 per cent of the total employment. There is a possibility that these extreme levels might have influenced the overall findings. Hence, sub-sample analysis is conducted for each form of self-employment by excluding from the estimations in Table 5 all those countries with more than 90 per cent of the respective self-employment levels[8]. For instance, from column 1 of Table 5, countries with total self-employment levels exceeding 90 per cent of total employment were omitted. The same exercise was then repeated for both male and female self-employed individuals. This sub-sample analysis suggests that extremely high levels of self-employment do not drive the overall findings obtained in Table 5.

Section 4: Concluding remarks
Given the growing role of self-employment in providing employment opportunities to those at the lower end of the income spectrum in developing countries, this study investigated when self-employment narrows inequality in these countries. For this purpose, five-yearly average

data from 72 developing countries covering 2000-2019 is used. Measures of self-employment include total, male and female participation levels. The empirical analysis is based on the dynamic panel data techniques and the Sasabuchi (1980) and Lind and Mehlum (2010) tests. Several robustness checks validate the findings. Prima facie, the study's findings suggest that self-employment narrows inequality in developing countries. The income-equalising effect can be seen, however, when the total, male, and female self-employment levels are below the optimal of 54.22 per cent of total employment, 52.50 per cent of male employment, and 54.19 per cent of female employment, respectively. Inequality widens when self-employment levels exceed these optimal levels. In other words, in situations where there are not enough gainful employment opportunities, self-employment is the most effective way to narrow inequality only when it falls below the above-defined optimal levels. Self-employment levels above earlier identified optimal levels, however, tend to widen inequality. Further, it follows from this finding that the income-narrowing effect of self-employment is larger than its income-widening effect, emphasising further the importance of keeping self-employment below the optimal levels discussed earlier.

Second, highlighting the predicament of female workers in this form of employment, the income-narrowing effects of female workers are found to be lower than they are for their male counterparts. This finding should, however, be interpreted with caution, as it does not necessarily imply that female self-employment cannot be used as an effective policy tool for reducing inequality or those female workers are intrinsically less capable of reducing inequality. Rather, the findings suggest that if developing countries are looking to substantially reduce inequality, male self-employment should take precedence over female self-employment. In terms of the sub-sample analysis, there is no evidence to suggest that findings are driven by countries from EAP, ECA, MENA and SA regions. However, there is evidence to suggest that countries from LAC and SSA drove the overall findings. Further sub-sample analysis involving the exclusion of countries with self-employment levels beyond 90 per cent also confirms the robustness of the findings. In terms of the control variables, growth in urban population and aid showed consistent and statistically negative effects on inequality.

In light of the above findings, policy interventions aiming to reduce inequality in developing countries should place the interests of self-employed workers at the forefront of policy discussions. In principle, because excessive levels of self-employment are associated with increased inequality, it would be prudent to employ selective and targeted policy interventions to limit the self-employment levels by providing them with alternate means of survival, i.e., more gainful employment opportunities are advised. The problem, however, is that if developing countries create these opportunities without ensuring that their workers can utilise them, then this defeats the very purpose of creating these opportunities in the first place. Consequently, interventions designed to create such opportunities should also be accompanied by interventions aimed at improving the workers' skills so they may be able to take advantage of them. In order to provide a decent living for the workers who remain in self-employment, policy actions should prioritise improving the working conditions of their employment and ensuring their wages are appropriately compensated. Further, policymakers ought to pay more attention to the fact that the inequality-narrowing effects of female self-employment workers on narrowing inequality are less than the impact of their counterparts. Consequently, if socio-cultural factors contribute to female workers' inability to earn more or at least be on par with their male counterparts, as discussed in this paper's findings section, affirmative policies that eliminate these barriers should be developed. It is unlikely that developing countries will succeed in achieving gender equality or reducing inequality if these

barriers are not removed. Apart from the above interventions, structural problems in developing countries that have contributed to the high prevalence of self-employment in the first place must be addressed. If the underlying problems are not addressed, developing countries will continue to experience increasing levels of self-employment levels and widening inequalities, ultimately defeating any attempts by developing countries to achieve SDG 8 and SDG 10. Nevertheless, resolving the underlying problems is a long-term process that requires considerable effort and should therefore be viewed as a long-term objective. Future research may be interested in exploring the challenges that female workers face in self-employment, in addition to examining the conditions under which the inequality-reducing effects of self-employment can be enhanced.

Appendix

Table 1: Definitions of the variables used in the study

Variable	Definition	Data source
gini	Estimate of Gini index of inequality in equivalized household market income.	The Standardised World Income Inequality Database
self_tot	Total self-employment as a percentage of total employment	World Development Indicators
self_male	Male self-employment as a percentage of male employment	World Development Indicators
self_fem	Female self-employment as a percentage of female employment	World Development Indicators
gdp	Gross domestic product per capita in constant 2010 US dollars	World Development Indicators
edu	Average years of secondary schooling, age 15+, total	Barro& Lee dataset
infla	Inflation, gross domestic product deflator as an annual percentage	World Development Indicators
pop	Urban population as a percentage of the total population	World Development Indicators
govt	General government final consumption expenditure as a percentage of gross domestic product	World Development Indicators
trade	Trade as a percentage of gross domestic product	World Development Indicators
aid	Net official development assistance received as a percentage of gross capital formation	World Development Indicators
fdi	Inward foreign direct investment flows in US dollars at current prices in millions. Data on FDI flows are presented on net bases.	United Nations Conference on Trade and Development
fi	Natural logarithm of domestic credit to the private sector as a percentage of gross domestic product	Global Financial Development
inst	Degree of democracy based on the average score of political and civil rights	Freedom House

Source: Author's own work based on the definitions drawn from various sources

Table 2: List of countries used in the study

East Asia and Pacific - China, Indonesia, Korea, Rep., Malaysia, Papua New Guinea, Philippines, Thailand, Vietnam

Europe and Central Asia – Turkey

Latin America and the Caribbean - Argentina, Barbados, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Uruguay, Venezuela, RB

The Middle East and North Africa - Algeria, Egypt, Arab Rep., Iran, Islamic Rep., Iraq, Israel, Jordan, Morocco, Saudi Arabia, Tunisia

South Asia - Bangladesh, India, Nepal, Pakistan, Sri Lanka

Sub-Saharan Africa - Benin, Botswana, Burundi, Cameroon, Central African Republic, Congo, Dem. Rep., Congo, Rep., Cote d'Ivoire, Gabon, Gambia, The, Ghana, Kenya, Lesotho, Liberia, Malawi, Mali, Mauritius, Mozambique, Namibia, Niger, Rwanda, Senegal, Sierra Leone, South Africa, Tanzania, Togo, Uganda, Zimbabwe

Source: World Bank's country classification

Table 3: Summary statistics

Variables	No of observations	Mean	Standard deviation	Minimum value	Maximum value
gini	234	47.30	7.07	33.0	72.0
self_tot	234	53.20	23.03	5.7	93.6
self_male	234	50.81	20.49	6.3	91.7
self_fem	234	56.21	27.10	1.6	96.9
gdp	233	4386.75	4374.66	226.4	26958.7
edu	185	2.03	1.04	0.1	4.6
infla	233	7.76	6.96	-0.4	40.3
pop	234	51.22	22.07	8.7	95.2
govt	232	13.75	4.55	5.0	39.1
trade	232	70.47	34.07	24.5	205.5
aid	229	27.15	65.24	-0.4	720.5
fdi	234	5584.78	15821.00	-1166.6	137026.6
fi	231	3.38	0.84	0.9	5.0
inst	234	3.58	1.53	1.0	6.9

Source: Author's own calculation

Table 4: Correlation matrix

Variables	gini	self_tot	self_male	self_fem	gdp	edu	infla	pop	govt	trade	aid	fdi	fi	inst
gini	1													
self_tot	-0.148**	1												
self_male	-0.183**	0.987***	1											
self_fem	-0.121*	0.980***	0.940***	1										
gdp	0.0769	-0.695***	-0.672***	-0.697***	1									
edu	-0.006	-0.695***	-0.679***	-0.694***	0.589***	1								
infla	0.098	-0.034	-0.029	-0.037	0.008	-0.072	1							
pop	0.085	-0.664***	-0.644***	-0.669***	0.674***	0.580***	0.068	1						
govt	0.309***	-0.280***	-0.302***	-0.263***	0.218***	0.067	0.053	0.056	1					
trade	0.042	-0.312***	-0.333***	-0.300***	0.095	0.356***	-0.088	0.056	0.277***	1				
aid	-0.033	0.444***	0.448***	0.411***	-0.309***	-0.403***	0.076	-0.352***	-0.001	-0.114*	1			
fdi	-0.004	-0.110*	-0.086	-0.130*	0.178**	0.163**	-0.029	0.163**	0.034	-0.106	-0.131*	1		
fi	0.106	-0.552***	-0.549***	-0.528***	0.332***	0.493***	-0.025	0.284***	0.179**	0.319***	-0.462***	0.273***	1	
inst	-0.297***	0.373***	0.349***	0.390***	-0.338***	-0.294***	-0.010	-0.280***	-0.110	-0.154**	0.226***	0.074	-0.228***	1

Source: Author's own calculation

## Table 5: Main results using the two-step system GMM approach

	(1)	(2)	(3)
Variables	Total self-	Male self-	Female self-

	employment	employment	employment
lag gini	0.982***	0.981***	0.995***
	(0.036)	(0.040)	(0.033)
lag self_tot	-0.080**		
	(0.036)		
lag self_tot^2	0.001**		
	(0.000)		
lag self_male		-0.090**	
		(0.039)	
lag self_male^2		0.001**	
		(0.000)	
lag self_fem			-0.052**
			(0.025)
lag self_fem^2			0.001**
			(0.000)
lag gdp	-0.001	-0.001*	-0.001
	(0.000)	(0.000)	(0.000)
lag gdp^2	0.001*	0.001**	0.001
	(0.000)	(0.000)	(0.000)
lag edu	0.335*	0.336*	0.356**
	(0.169)	(0.180)	(0.154)
lag infla	-0.011	-0.011	-0.008
	(0.016)	(0.017)	(0.016)
lag pop	-0.014*	-0.014*	-0.019**
	(0.008)	(0.007)	(0.007)
lag govt	0.014	0.007	0.004
	(0.037)	(0.037)	(0.041)
lag trade	-0.001	-0.001	0.001
	(0.003)	(0.002)	(0.003)
lag aid	-0.006***	-0.006***	-0.005***
	(0.002)	(0.001)	(0.002)
lag fdi	0.001*	0.001*	0.001**
	(0.000)	(0.000)	(0.000)
lag fi	-0.488**	-0.463**	-0.490**
	(0.195)	(0.193)	(0.204)
lag inst	0.017	0.010	0.019
	(0.078)	(0.084)	(0.064)
No of observations	234	234	234
No of countries	72	72	72
Year dummy included	Yes	Yes	Yes
No of instruments	38	38	38
Hansen p-value	0.382	0.407	0.280
AR (2) p-value	0.435	0.531	0.367
U-test	2.22	2.30	2.10
	[0.01]	[0.01]	[0.02]
Minimum value	-0.08	-0.09	-0.05
Maximum value	0.07	0.08	0.04
Optimal value	54.23	52.50	54.19
Confidence interval,	22.69, 67.56	25.63, 66.52	11.93, 71.21

Source: Author's own calculation

Notes: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; Constant included but not reported; The Hansen test is used to evaluate the joint validity of the instruments used. The p-value of the U-test is reported in square brackets. The dependent variable is the estimate of the Gini index of inequality in equivalized household market income.
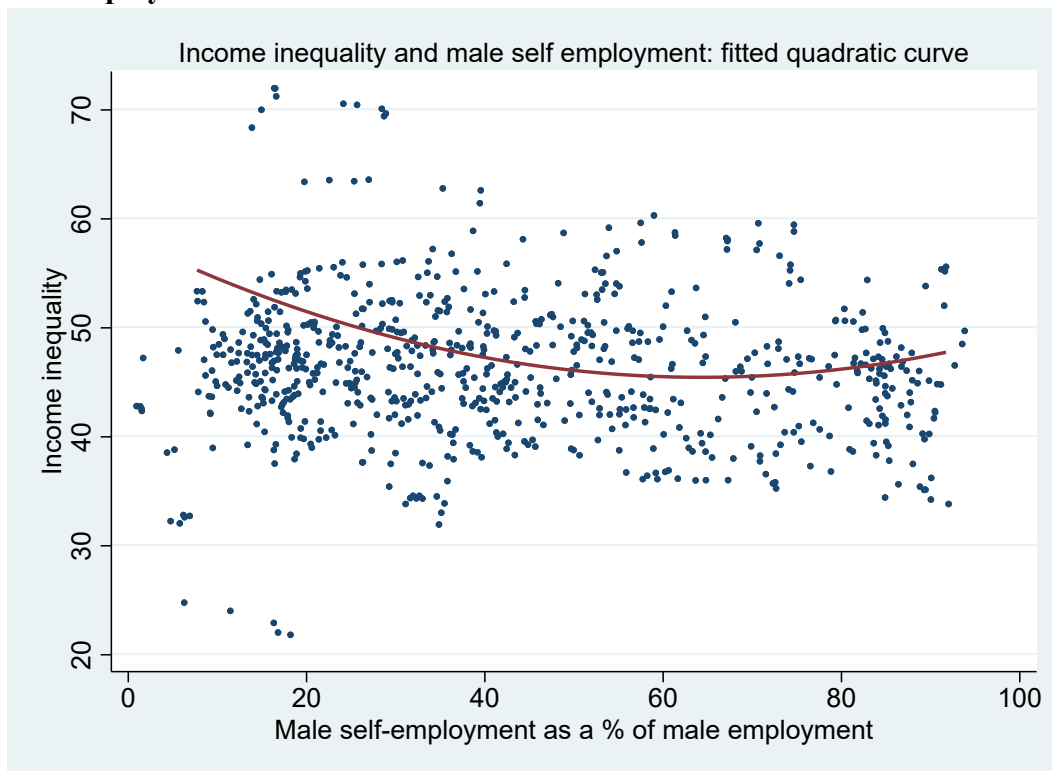
Figure 1a: Scatter plot showing the association between income inequality and total self-employment
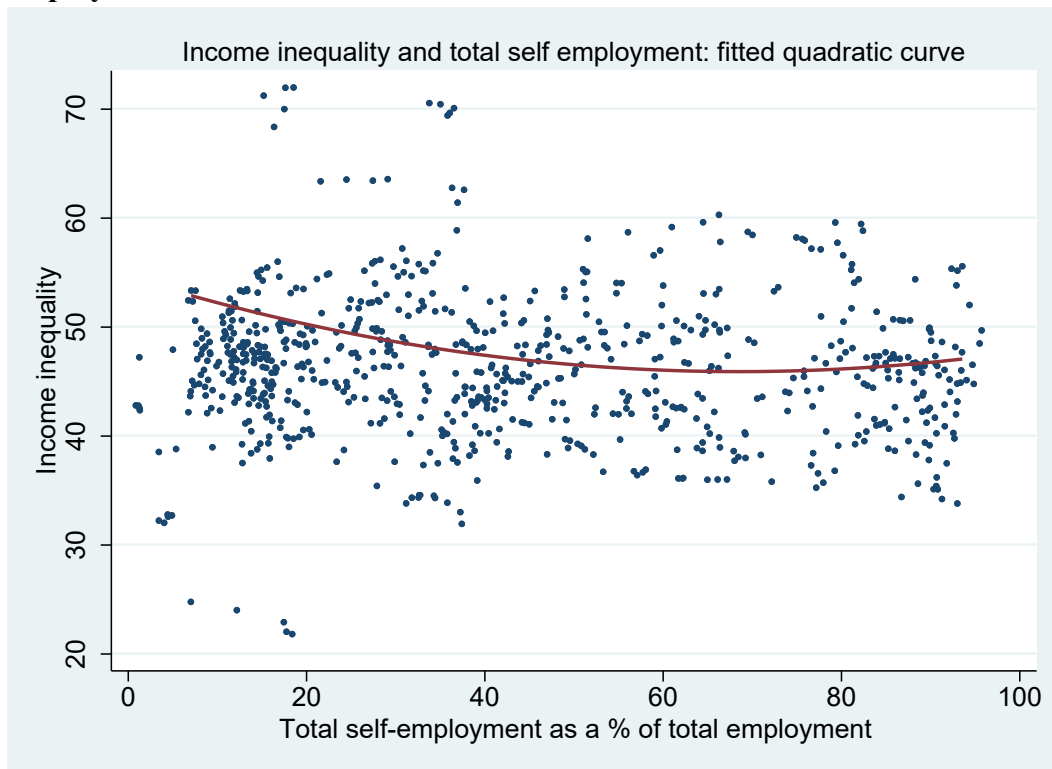
Source: Author's own work based on the data from the Standardised World Income Inequality Database and World Bank Indicators
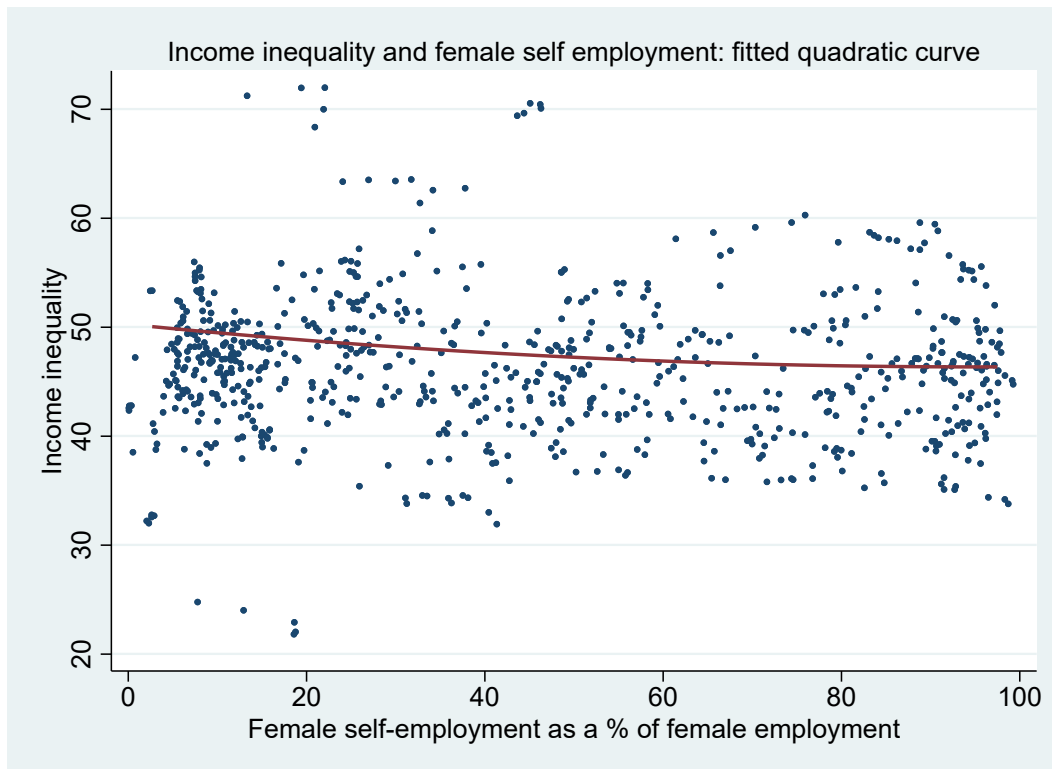
Figure 1b: Scatter plot showing the association between income inequality and male self-employment

Source: Author's own work based on the data from the Standardised World Income Inequality Database and World Bank Indicators

Figure 1c: Scatter plot showing the association between income inequality and female self-employment

Income inequality and female self employment: fitted quadratic curve

Source: Author's own work based on the data from the Standardised World Income Inequality Database and World Bank Indicators

References

Ahluwalia, M. S. (1976), "Inequality, poverty and development", *Journal of Development Economics,* Vol. 3 No. 4, pp. 307-342.

Alesina, A. and Perotti, R. (1996), "Income distribution, political instability, and investment", *European Economic Review,* Vol. 40 No. 6, pp. 1203-1228.

Anderson, E. Jalles D'Orey, M. A. Duvendack, M. and Esposito, L. (2017), "Does government spending affect income inequality? A meta-regression analysis", *Journal of Economic Surveys,* Vol. 31 No. 4, pp. 961-987.

Arellano, M. and Bond, S. (1991), "Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations", *The Review of Economic Studies,* Vol. 58 No. 2, pp. 277-297.

Arellano, M. and Bover, O. (1995), "Another look at the instrumental variable estimation of error-components models", *Journal of Econometrics,* Vol. 68 No. 1, pp. 29-51.

Barro, R. J. (2000), "Inequality and growth in a panel of countries", *Journal of Economic Growth,* Vol. 5 No. 1, pp. 5-32.

Beck, T. Demirgüç-Kunt, A. and Levine, R. (2007), "Finance, inequality and the poor", *Journal of Economic Growth,* Vol. 12 No. 1, pp. 27-49.

Beneria, L. (1981), "Conceptualising the labor force: The underestimation of women's economic activities", *The Journal of Development Studies,* Vol. 17 No. 3, pp. 10-28.

Bertola, G. (1990), "Job security, employment and wages", *European Economic Review,* Vol. 34 No. 4, pp. 851-879.

Blundell, R. and Bond, S. (1998), "Initial conditions and moment restrictions in dynamic panel data models", *Journal of Econometrics,* Vol. 87 No. 1, pp. 115-143.

Burnside, C. and Dollar, D. (2000), "Aid, policies, and growth", *The American Economic Review,* Vol. 90 No. 4, pp. 847-868.

Dabla-Norris, E. Kochhar, K. Ricka, F. Suphaphiphat, N. and Tsounta, E. (2015). Causes and Consequences of Income Inequality: A Global Perspective. *International Monetary Fund Staff Discussion Note 15/13.*

Deininger, K. and Squire, L. (1998), "New ways of looking at old issues: inequality and growth", *Journal of Development Economics,* Vol. 57 No. 2, pp. 259-287.

Djankov, S. and Ramalho, R. (2009), "Employment laws in developing countries", *Journal of Comparative Economics,* Vol. 37 No. 1, pp. 3-13.

Durlauf, S. N. (1996), "A theory of persistent income inequality", *Journal of Economic Growth,* Vol. 1 No. 1, pp. 75-93.

Easterly, W. Levine, R. and Roodman, D. (2004), "Aid, policies, and growth: Comment", *The American Economic Review,* Vol. 94 No. 3, pp. 774-780.

ESCAP. (2019). A guide to inequality and the SDGs. *Economic and social commission for Asia and the Pacific.* Thailand: United Nations.

Fields, G. S. (2019), "Self-employment and poverty in developing countries", *IZA World of Labor,* Vol. 2 No. 60, pp. 1-10.

Furceri, D. Jalles, J. T. and Loungani, P. (2020), "On the determinants of the Okun's law: New evidence from time-varying estimates", *Comparative Economic Studies,* Vol. 62 No. 4, pp. 661-700.

Gastwirth, J. L. (1972), "The Estimation of the Lorenz Curve and Gini Index", *The Review of Economics and Statistics,* Vol. 54 No. 3, pp. 306-316.

Gastwirth, J. L. (2017), "Is the Gini Index of Inequality Overly Sensitive to Changes in the Middle of the Income Distribution?", *Statistics and Public Policy,* Vol. 4 No. 1, pp. 1-11.

ILO. (2010). Women in labour markets: measuring progress and identifying challenges. Geneva: International Labour Office.

Jaumotte, F. Lall, S. and Papageorgiou, C. (2013), "Rising income inequality: technology, or trade and financial globalisation?", *IMF Economic Review,* Vol. 61 No. 2, pp. 271-309.

Jayachandran, S. (2020). Social norms as a barrier to women's employment in developing countries. *NBER working paper series.* Cambridge, MA.: National Bureau of Economic Research.

Karnane, P. and Quinn, M. A. (2019), "Political instability, ethnic fractionalisation and economic growth", *International Economics and Economic Policy,* Vol. 16 No. 2, pp. 435-461.

Karnani, A. (2005), "Misfortune at the bottom of the pyramid", *Greener Management International,* Vol. No. 51, pp. 99-110.

Kuznets, S. (1955), "Economic growth and income inequality", *The American Economic Review,* Vol. 45 No. 1, pp. 1-28.

Law, C.-H. and Soon, S.-V. (2020), "The impact of inflation on income inequality: the role of institutional quality", *Applied Economics Letters,* Vol. 27 No. 21, pp. 1735-1738.

Lee, J.-W. and Lee, H. (2018), "Human capital and income inequality", *Journal of the Asia Pacific Economy,* Vol. 23 No. 4, pp. 554-583.

Lind, J. T. and Mehlum, H. (2010), "With or without U? The appropriate test for a U-shaped relationship", *Oxford Bulletin of Economics and Statistics,* Vol. 72 No. 1, pp. 109-118.

Lynch, J. Smith, G. Hillemeier, M. Shaw, M. Raghunathan, T. and Kaplan, G. (2001), "Income inequality, the psychosocial environment, and health: Comparisons of wealthy nations", *Lancet,* Vol. 358 No. 9277, pp. 194-200.

Narita, R. (2020), "Self-employment in developing countries: A search-equilibrium approach", *Review of Economic Dynamics,* Vol. 35 No., pp. 1-34.

Odedokun, M. and Round, J. I. (2004), "Determinants of income inequality and its effects on economic growth: Evidence from African countries", *African Development Review,* Vol. 16 No. 2, pp. 287-327.

OECD/ILO. (2019). Tackling vulnerability in the informal economy. Paris: Development Centre Studies, OECD publishing.

Ostry, J. D. Berg, A. and Tsangarides, C. G. (2014). Redistribution, inequality and growth. *Staff Discussion Notes No. 14/02.* Washington, DC USA: International Monetary Fund.

Papageorgiou, C. Lall, S. and Jaumotte, F. (2008). Rising income inequality: technology, or trade and financial globalisation? Washington, DC USA: International Monetary Fund.

Perotti, R. (1996), "Growth, income distribution, and democracy: What the data say", *Journal of Economic Growth,* Vol. 1 No. 2, pp. 149-187.

Persson, T. and Tabellini, G. (1994), "Is inequality harmful for growth?", *The American Economic Review,* Vol. 84 No. 3, pp. 600-621.

Piketty, T. Saez, E. and Stantcheva, S. (2014), "Optimal taxation of top labor incomes: A tale of three elasticities", *American Economic Journal: Economic Policy,* Vol. 6 No. 1, pp. 230-71.

Reuveny, R. and Li, Q. (2003), "Economic openness, democracy, and income inequality: An empirical analysis", *Comparative Political Studies,* Vol. 36 No. 5, pp. 575-601.

Rodgers, G. (1983), "Population growth, inequality and poverty", *International Labour Review,* Vol. 122 No. 4, pp. 443-460.

Rodrik, D. (1999), "Where did all the growth go? External shocks, social conflict, and growth collapses", *Journal of Economic Growth,* Vol. 4 No. 4, pp. 385-412.

Roodman, D. (2009), "A Note on the theme of too many instruments", *Oxford Bulletin of Economics and Statistics,* Vol. 71 No. 1, pp. 135-158.

Rothstein, B. and Uslaner, E. M. (2005), "All for all: Equality, corruption, and social trust", *World Politics,* Vol. 58 No. 1, pp. 41-72.

Rottenberg, S. (1956), "On Choice in Labor Markets", *Industrial and Labor Relations Review,* Vol. 9 No. 2, pp. 183-199.

Sasabuchi, S. (1980), "A test of a multivariate normal mean with composite hypotheses determined by linear inequalities", *Biometrika,* Vol. 67 No. 2, pp. 429-439.

Siami-Namini, S. and Hudson, D. (2019), "Inflation and income inequality in developed and developing countries", *Journal of Economic Studies,* Vol. 46 No. 3, pp. 611-632.

Sidek, N. Z. M. (2021), "Do government expenditure reduce income inequality: evidence from developing and developed countries", *Studies in Economics and Finance,* Vol. 38 No. 2, pp. 447-503.

Stähler, N. (2008), "Unemployment and employment protection in a unionised economy with search frictions", *Labour,* Vol. 22 No. 2, pp. 271-289.

United Nations. (2018). Equality: Why it matters? New York: United Nations.

Wells, R. (2006), "Education's effect on income inequality: an economic globalisation perspective", *Globalisation, Societies and Education,* Vol. 4 No. 3, pp. 371-391.

Wilkinson, R. G. (1992), "Income distribution and life expectancy", *British Medical Journal,* Vol. 304 No. 6820, pp. 165–168.

Windmeijer, F. (2005), "A finite sample correction for the variance of linear efficient two-step GMM estimators", *Journal of Econometrics,* Vol. 126 No. 1, pp. 25-51.

World Bank. 2022. *Metadata glossary* [Online]. World Bank. Available: https://databank.worldbank.org/metadataglossary/jobs/series/SL.EMP.SELF.ZS [Accessed 4 January 2022].

Yerrabati, S. (2021), "Self-employment and economic growth in developing countries: is more self-employment better?", *Journal of Economic Studies,* Vol. 49 No. 2, pp. 315-329.

Yerrabati, S. (2022a), "Does vulnerable employment alleviate poverty in developing countries?", *Economic Modelling,* Vol. No., pp. 106043.

Yerrabati, S. (2022b), "Self-employment: a means to reduce poverty in developing countries?", *Journal of Economic Studies,* Vol. ahead-of-print No. ahead-of-print, pp.

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[1] Please see Ahluwalia (1976), Odedokun and Round (2004), Wells (2006), Jaumotte *et al.* (2013), Dabla-Norris *et al.* (2015), Furceri *et al.* (2020).

[2] For an elaboration on this, please read Fields (2019), Narita (2020).

[3] The self-employment rate among the majority of developing nations where data is available between 1995 and 2019 was 56.64 per cent in 1995 and 56.02 per cent in 2019, indicating that more than half of the population is self-employed. In addition, both male and female self-employment have remained high over the years. In 1995, 54.39 per cent of male workers were self-employed, compared to 53.79 per cent in 2019. In contrast, the number of self-employed women was 59.65 per cent and 58.91 per cent, respectively.

[4] During 1990 - 2019, the income shares of the lowest 10 per cent of people in developing countries decreased from 2.44 to 2.03. In addition, the income shares of the lowest 20 per cent decreased from 6.04 to 5.34. Contrastingly, however, while the income shares of the highest 10 per cent of the population marginally decreased from 33.41 to 33.15, and the income share of those held by the highest 20 per cent rose from 48.86 to 49.23. The Gini Index also increased from 42.11 to 43.585 during the same period. It is evident from the figures that while lower-income groups have seen their standard of living decline, higher-income groups have seen their standard of living increase, demonstrating the growing inequalities in developing countries.

[5] A change in relative income at either the bottom or top of the distribution will affect inequality since inequality is a measure of mean differences. To understand how the Gini index is calculated and how changes in household income affect the Gini index, please refer to (Gastwirth, 2017, Gastwirth, 1972).

[6] The figure for employment in developing countries is 76.5%, that in emerging countries is 46.2%, and that in developed countries is 10.0%.

[7] The coefficients of the linear and non-linear terms of total, male and female self-employment are: -.080447 and 0007418, -.0901257 and .0008583, and -.0520124 and .0004799. However, the values reported in Table 5 are rounded to three decimal values. When calculating the optimal points, the actual values are used. The optimal point for total self-employment is calculated using the first derivative: di - (-.080447) / (2 *.0007418) = 54.22; the corresponding calculations for male and female self-employment are: - (-.0901257) / (2 * .0008583) = 52.50 and - (-.0520124) / (2 * .0004799) = 54.19. Please read Sasabuchi (1980) and Lind and Mehlum (2010) for more on how these values are calculated.

[8] Please refer to the online appendix.