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DISCUSSION PAPER SERIES

IZA DP No. 15680

The Effect of Firm-Level Investment on Inequality and Poverty around the World

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ABSTRACT

The Effect of Firm-Level Investment on Inequality and Poverty around the World

This paper investigates the effect of firm-level investment on the levels of income inequality and poverty. Using a sample of firms from 87 countries for the period from 1979 to 2018, we document that firm-level investment is negatively associated with various measures of income inequality. This negative association is robust to alternative firm-level capital investment proxies, empirical model specifications, and a variety of country-level controls. Further evidence shows that firm-level investment is also negatively related to several measures of poverty. Overall, our results indicate that firm-level capital expenditures provide benefit to the poor and, thus, decreases income inequality. Our findings indicate that firm-level capital investment can be a valuable tool for countries that are aiming to achieve the United Nations' Sustainable Development Goals of reducing inequality and poverty. Our results may also be beneficial to policy makers as they consider a variety of regulatory and taxation measures that may constrain or help firm's ability to invest.

JEL Classification: D31, E22, I32, O15, O16

Keywords: income inequality, corporate capital expenditure, poverty, Sustainable Development Goals (SDGs)

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1. Introduction

Inequality has been one of the most discussed topics in recent decades. This discussion occurs frequently in political debate, news coverage, and is listed by inter-governmental organizations, such as the United Nations and the World Bank, as a major challenge facing the world. The United Nations emphasizes aspects of inequality multiple times in their list of Sustainable Development Goals (SDGs), which all countries around the world aim to achieve by 2030. While countries around the world agreed to work towards solving inequality and related issues emphasized by SDGs, Stiglitz (2020) and Qureshi (2020), among others, have argued that inequality got worse during the COVID-19 pandemic. In an article published in the Fall 2020 issue of IMF's Finance & Development, Joseph Stiglitz notes "COVID-19 has exposed and exacerbated inequalities between countries just as it has within countries." (Stiglitz 2020: 19)

Inequality has also garnered the attention of researchers in social science and business fields, who have examined the factors behind rising inequality (Piketty & Saez, 2003; Acemoglu & Autor, 2011; Piketty, 2013; Blau, 2018; Song, et al., 2019; Gokmen & Morin, 2021). For instance, researchers have examined the role that the financial system plays in determining inequality in a society. Demirguc-Kunt and Levine (2009) survey the theoretical literature on finance and inequality, noting that theory has produced conflicting results. Demirguc-Kunt and Levine (2009) explain that on one hand access to finance may improve economic opportunities for disadvantaged groups, reducing inequality; while on the other, access to finance may be accessible primarily to wealthy individuals and firms, furthering inequality. While the economic theory has produced conflicting results, the empirical literature largely finds that development of financial markets is associated with reducing inequalities (e.g., Blau, 2018).[1]

[1] The relationship between corporate taxation and inequality has been a popular area of research (Ablett and Hart, 2005; Arulampalam *et al.*, 2012; Nallareddy *et al.*, 2018; Fuest *et al.*, 2018; Saez and Zucman, 2019; Hines, 2020; Faccio and Iacono, 2021).

Firm-level capital investment has also received much attention recently. While investment has remained sluggish, particularly since the 2008 global financial crisis (Hall, 2015; Gutierrez & Philippon, 2017; Crouzet & Eberly, 2019), this period of stagnation ended recently during the COVID-19 pandemic. There has been a considerable rise in capital expenditures by firms around the world after the first few months of the pandemic. A recent article in the Economist argues that this capital-spending spree will likely continue in the post-pandemic world.[2] Hence, it is important and timely to examine the changes in capital expenditures of firms together with changes in inequality and poverty, which has not been addressed widely in the previous literature.

While researchers have largely examined the financial system and development of capital markets generally, we take a more specific approach by studying the role of firms through capital expenditures. If we consider the argument from Demirguc-Kunt and Levine (2009) where firms are beneficiaries of improved capital markets and financial intermediation, then firms will have capital resources that allow them to invest in capital expenditures. However, what role does this process play in either exacerbating or mitigating income inequalities? In this study we examine this question. We take a global approach examining 87 countries over the period 1979-2018. We utilize cross-sectional differences across countries over this period to examine how firm investment impacts inequalities. Since, a firm's access to capital depends on functioning capital markets, we also consider instances where financial intermediaries get constrained as in a banking crisis or when banks become financially distressed as exogenous shocks to examine the impact of firm investment on inequalities. Finally, we consider a pathway through which firm investment may impact inequality, namely through reducing poverty. Our analysis can be useful for policy

[2] The Economist article is from https://www.economist.com/leaders/2021/05/29/firms-are-rediscovering-their-love-for-capex-good?frsc=dg%7Ce.

makers who are interested in accomplishing the UN's SDG that are related to reducing inequality and poverty.

To empirically assess the relation between firm level capital expenditure and inequality, we obtain income inequality and poverty data from the World Bank. Additionally, we collect data on other country characteristics such as a country's Gross Domestic Product (GDP), economic fitness, unemployment, status of the country's banking system, savings, and net exports to serve as controls and inform our cross-sectional analysis. We supplement this data with firm-level data from North American Compustat and Global Compustat, which we subsequently aggregate to a country-level,[3] which allows us to examine firm investment.

In our first set of tests, we regress five income inequality proxies on firm level capital spending proxies and previously identified determinants of income inequality.[4] Our results show that firms' capital expenditures play an important role in mitigating inequalities. Specifically, a one-standard-deviation increase in capital expenditure is associated with a 4.58% reduction in the Gini index, the main measure of income inequality.[5] For comparison, in his influential study, Blau (2018) documents that one standard deviation increase in a country's stock market liquidity decreases Gini index by 1%-6%. Thus, our findings indicate that firm level capital expenditure's impact on inequality is comparable to that of a country's stock market liquidity. We also find that a one-standard-deviation shock to capital expenditure reduces the income share held by the richest 10% by 4.29% and increases the income share held by the poorest 10% by 14.37%. These results are robust to alternative capital expenditure proxies, empirical model specifications, and a number of country-level controls.

[3] In this process, we follow the methods used by Jin and Myers (2006) and Morck, Yeung, and Yu (2000).
[4] Our empirical specifications are similar to Blau (2018).
[5] We discuss all inequality measures in Section 3.

Next, we document how country level characteristics affect the inequality and capital expenditure relation. To this end, we sort countries in our sample into two groups by their economic fitness, GPD per capita, unemployment rates, the probability of default of a country's banking system, the competition in the banking market, and having a banking crisis. We find that capital expenditure is negatively associated with income inequality regardless of a country's economic fitness, unemployment rates, the probability of default of a country's banking system and the competition in the banking market. Interestingly, we find that in countries with high GDP per capita capital expenditure and inequality relation is statistically insignificant. Instead, we find in countries with low GDP per capital expenditure is negatively associated with inequality. Also, if the country is having a banking crisis, the negative impact of capital expenditure on inequality disappears. This finding suggests that extreme shocks to a country's banking system negatively affects capital expenditure and inequality link.

Finally, to further our understanding of the negative relation between capital expenditure and inequality, we investigate the link between capital expenditure and poverty. Here, using poverty measures from the World Bank, we find that firms' capital investments decrease the percentage of population suffering from poverty and alleviate the intensity of poverty in a nation significantly. Combined with our earlier tests, these findings indicate that firm level capital expenditures provide benefit to the poor and, thus, decreases income inequality. Thus, firm-level capital expenditure can be a valuable tool for countries that are aiming to realize the UN's SDGs of reducing inequality and poverty.

Our study makes several contributions. By documenting the negative impact of firm level capital expenditure on inequality, we contribute to the line of research related to firm's role in the economic ecosystem. Previous studies show that information asymmetry in credit markets (Gokmen and Morin, 2021), dispersion of earnings between firms (Song *et al.,* 2019) and foreign

direct investment participation (Chen, Ge, and Lai, 2011) have significant impact on inequality. Our results indicate that firms' capital investments also play a significant role in inequality and poverty. Our findings also contribute to the recent literature on the impact of financial markets on inequality. Income inequality is negatively associated with stock market liquidity (Blau, 2018) and stock price volatility (Blau, Griffith, and Whitby, 2021). Our findings indicate that in addition to trading related phenomena on firms' stocks, firms' investment policies are also important for income in equality. Finally, we contribute the strand of research on finance and economic growth and development. Previous studies document significant impacts of financial systems and financial intermediaries on growth under different settings (e.g., Beck, 2012; Law and Singh, 2014). We extend this line of research by documenting firm level investment can impact societal factors such as inequality and poverty. We believe our study is timely as countries around the world consider the role of firms in society. Our findings may be of interest to policy makers as they consider a variety of regulatory and taxation measures that may constrain or help firm's ability to invest.

2. Related Literature

Our study is motivated by the literature that examined the role of finance in economic growth, and other societal outcomes such as income distribution. Beck (2012) surveys the literature that examines how the financial system and financial intermediaries impact economic growth. On the theoretical front, the financial system can make product and service markets more efficient by providing payment services (Greenwood and Smith, 1997). Acting as intermediaries the financial system can pool savings which can overcome project indivisibility allowing for scale economies (Acemoglu and Zilibotti, 1997). Also, through their due diligence and monitoring function the financial system allows for more investment projects to be financed and entrepreneurs to be identified (King and Levine, 1993; Blackburn and Hung, 1998). The financial system can enable

long-term investment by reducing liquidity risk (Diamond & Dybvig, 1983). Demirguc-Kunt and Levine (2009) and Beck (2012) report that the empirical literature largely finds financial system and access to finance drives economic growth.

However, some studies that suggest that the effect of the financial system within a country may not be strictly positive and/or has limits. For example, Law and Singh's (2014) findings suggest that the relationship between finance and growth is non-linear and has an optimal level. Furthermore, there may be unequal effects to the distribution of income within a country. Kuznets (1955) suggests that as a country's economy develops, income inequality widens, albeit this inequality will narrow as the economy reaches a more mature state. This conjecture is also shown in the theoretical work of Greenwood and Jovanovic (1990).

While the above studies focus on the financial system, relatively fewer studies examine how firms play an important role in the economic ecosystem and may have an impact on inequality. Song *et al.* (2019) shows that the majority of the earnings inequality in the U.S. is due to an increase in the dispersion of annual earnings between firms. The remaining part is due to the dispersion within firms. Gokmen and Morin's (2021) model shows a decrease in income inequality after a negative investment shock when there is information asymmetry in the credit markets. Chen, Ge, and Lai (2011) find that foreign exposure in investment explains some of the wage inequality between enterprises in China. Rajan and Zingales (1998) document that firms in capital-intensive industries, with heavier reliance on external capital, grow faster in countries with better-developed financial systems. Our study attempts to fill the gap in the literature by examining a pathway through which firms may have an impact on inequality and poverty. Since a firm's capital expenditures are investments in the firm that promote growth, it is reasonable to believe that this creates demand for labor. If there is increasing demand for labor this should have a positive effect

on income. How firm-level investment affects the income distribution, is an empirical question that we intend to examine.

3. Data and measures

We gather data on income inequality and poverty from the World Bank for the period 1979 to 2018. Our main measure of income inequality is the World Bank's Gini index (Gini) that measures the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution. The value of Gini ranges from 0, representing perfect equality, to 100, representing perfect inequality. We also employ four additional measures of income inequality. Inc90 is the income share held by the richest 10%. Inc80 is the income share held by the richest 20%. Inc20 is the income share held by the poorest 20%. Inc10 is the income share held by the poorest 10%.

To measure firm investment, we collect firm level capital expenditure data from North American Compustat and Global Compustat, which claim to hold 98% of the world's market capitalization.[6] We define two measures of firm level capital investments: *Capex* and *Capexrnd*. *Capex* is the capital expenditure scaled by beginning-of-year total assets. *Capexrnd* is the sum of capital expenditure and research and development (R&D) expenses scaled by beginning-of-year total assets. To transform firm level capital investment measures to country level measures we follow the methods used by Jin and Myers (2006) and Morck, Yeung and Yu (2000) and measure a country level capital investment as average firm level capital investment for each year that the country appears in our sample.

[6] Between North American Compustat database and the Global Compustat database we have 98% of the world's market capitalization. Source: http://fccee.ugr.es/pages/facultad/vicedecanatos/vicedecanato-de-investigacion-y-posgrado/documentos/bases-de-datos/compustat-for-academics/!

Our set of control variables is similar to related income inequality studies such as Blau (2018). Specifically, we control for *Savings*, the amount of gross savings relative to GDP, *BankCredit*, domestic credit to private sector by banks (% of GDP), *GDP growth*, annual growth in GDP, and *NetExport*, the difference between exports and imports (% of GDP). Variables are winsorized at 1% and 99% and detailed variable definitions are in the Appendix A.1. The sample includes 87 countries and 321,284 firm year observations from 1979 to 2018.

Table 1 provides descriptive statistics and the Pearson correlation coefficients of main variables used in our analysis. Interestingly, the main income inequality measure, *ln(Gini)*, and income share held by the richest percentiles have almost perfect positive correlations. However, *ln(Gini)* is negatively correlated with the income share held by the poorest percentiles. Our main capital investment variable, *Capexrnd*, is negatively correlated with *ln(Gini)*, *ln(Inc90)*, and *ln(Inc80)* and positively correlated with *ln(Inc20)* and *In(Inc10)*. These results are consistent with our main hypothesis that firm level capital investment can reduce income inequality. While our second capital investment measure, *Capex*, is positively correlated with income inequality measure this positive correlation disappears in our multivariate regressions (see Table 3). Finally, the correlations among control variables are moderate and thus alleviate concerns about multicollinearity.

{Insert Table 1}

Figures 1 and 2 provide graphical presentations of our capital expenditure and income inequality measures, respectively. Figure 1 shows the capital expenditure characteristics for the average country in our sample across our sample period. In general, capital investment is increasing from the early 1980s to about 1997. After the late 1990s, capital expenditure is becoming stable. Figure 2 shows the income inequality characteristics for the average country in our sample across the time period when the data was available. Interestingly, in general, the overall

income inequality index moves in the same direction with income held by the richest 10% and 20% but in the opposite direction with income held by the poorest 10% and 20% over time.

{Insert Figure 1}

{Insert Figure 2}

4.0 Empirical Results

4.1 Income inequality and capital expenditure main results

Our main objective is to determine the relation between firms' capital investments and income inequality. To this end, we adopt a multivariate model similar to Blau (2018). We estimate the following equation using pooled-country year observations in an unbalanced panel:

$$\begin{aligned}\mathrm{Ln}(Inequality)_{i,t} = \beta_1 Capxrnd_{i,t} + \beta_2 Ln(BankCredit)_{i,t} + \beta_3 GDPgrowth_{i,t} \\ +\beta_4 Ln(Savings)_{i,t} + \beta_2 NetExport_{i,t} + \alpha_t + \varepsilon_{i,t}.\end{aligned} \quad (1)$$

The dependent variables are five measures of inequality. The main measure of income inequality is the World Bank's Gini index (Gini). *Inc90* and *Inc80* are the income share held by the richest 10% and 20%. *Inc20* and *Inc10* are the income share held by the poorest 20% and 10%. The main variable of interest is the natural log of capital expenditure and R&D (*Capxrnd*). The control variables are the natural logarithms of *BankCredit*, *GDPgrowth* and *Savings*, and *NetExport*. Detailed variable descriptions and sources are in Appendix A.1. All regressions include year fixed effects and standard errors used to compute t-statistics, shown in parentheses, are adjusted for heteroscedasticity and within-country clustering.

Table 2 reports the relations between income inequality measures and capital expenditure and R&D. In model 1, the estimated coefficient for *Ln(Capxrnd)* is -1.4550 and statistically significant with a t-statistic of -3.27. The economic magnitude of this relationship is substantial. Indeed, a one-standard-deviation increase in *Capxrnd* is associated with a 4.58% reduction in the

Gini index. This result provides strong support for our hypothesis that firm level capital expenditure reduces income inequality. Models 2 and 3 show that firm level capital expenditure is negatively associated with income share held by the richest 10% and 20%. Specifically, a one-standard-deviation increase in *Capxrnd* decreases *Inc90* and *Inc80* by 4.29% and 3.17%, respectively. These findings are also consistent with our main hypothesis. Models 4 and 5 reveals that *Capxrnd* has stronger effects on income share held by the poorest 20% and 10%. The estimated coefficients for *Capxrnd* in models 4 and 5 are 2.7275 and 4.1686 and both estimates are statistically significant at 1% level. In terms of economic significance, one standard deviation increase in *Capxrnd* increases *Inc20* and *Inc10* by 9.18% and 14.37%, respectively. These findings also provide strong support for our main hypothesis that firm level capital expenditure can alleviate income inequality. The estimated coefficients on control variables are consistent with the findings of previous studies. For instance, in model 1 the estimated coefficient for *Ln(BankCredit)* is negative and statistically significant. This result is consistent with findings in prior literature (e.g., Demirguc-Kunt and Levine, 2009; Blau, 2018) and indicates that financial development is negatively associated with income inequality.[7] In Appendix A.2. Table 1, we report the regressions with income inequality measures and cash effective tax rate for corporations. Unlike our results for capital expenditures, we find a positive and significant relationship between the case effective tax rate and our inequality measures in models 1-3. While higher statutory tax rates are intended to reduce inequality, effective tax rates, which are driven by various tax provisions and accounting practices by corporations, may not produce the same intended effect on inequality. Additionally, regressions with lower income variables (Models 4-5) show a negative and statistically significant

[7] For robustness, we also estimate equation (1) with lagged independent variables. Table 2 Panel B summarizes these findings. The results are quantitatively similar to our main findings and show that firm level capital expenditure is negatively associated with income inequality.

relationship between corporate tax rate and the income held by the poorest 20% and 10%. Hence the effective corporate tax rate remains positively related to different inequality measures.[8]

{Insert Table 2}

For robustness, we also examine the income inequality and firm level investment relation with an alternative measure of capital expenditure. Specifically, we estimate equation (1) by replacing *Capxrnd* with *Capex*. Table 3 summarizes the results. Consistent with our main findings in Table 2, in all models the estimated coefficients on *Capex* are negative and statistically and economically significant. Specifically, models 1, 2, and 3 show one standard deviation increase in *Capex* is associated with 3.20%, 2.75% and 2.10% reductions in the *Gini index*, *Inc90*, and *Inc80*, respectively. In addition, models 4 and 5 indicate one standard deviation increase in *Capex* increases *Inc20* and *Inc10* by 8.29% and 13.08%, respectively. These results confirm our main findings in Table 2 and support our hypothesis that firm level capital expenditure can reduce income inequality.[9]

{Insert Table 3}

4.2 Inequality and capital expenditure conditioned on economic fitness and GDP

In this section, we examine how a country's economic fitness and GDP affect the relation between capital expenditure and income inequality. Economic Fitness (*EF*) is defined by the World Bank as "both a measure of a country's diversification and ability to produce complex goods on a globally competitive basis."[10] Countries with the highest levels of *EF* have capabilities to

[8] Note that including both the capital expenditure and effective corporate tax rate variables in the same regression also didn't change our main results for capital expenditures in Table 2 or effective corporate tax rate in Appendix A.2. Table 1.

[9] For robustness, we estimate the model with lagged independent variables. These results are summarized in Table 3 Panel B. The findings are quantitatively similar to our main findings and show that firm level capital expenditure is negatively associated with income inequality.

[10] Also, see Tacchella *et al.* (2013) for more information on this new measure of global competitiveness.

produce a diverse portfolio of products, ability to upgrade into ever-increasing complex goods, tend to have more predictable long-term growth, and to attain good competitive position relative to other countries. Countries with low *EF* levels tend to suffer from poverty, low capabilities, less predictable growth, low value-addition, and trouble upgrading and diversifying faster than other countries. We sort the countries in our sample into two categories based on *EF* and *GDP per capita* and then estimate equation (1) in each subsample.

Table 4 panels A and B report results for *EF* and *GDP per capita* subsamples. In panel A models 1 and 2 the estimated coefficients on *Capxrnd* are negative and statistically significant at 1% level. In economic terms, in low (high) *EF* countries one standard deviation increase in *Capxrnd* is associated with 5.23% (7.24%) decrease in Gini index. Models 3-6 document that *Capxrnd* is negatively associated with the income shares held by the richest 10% and 20% both in low and high *EF* countries. Models 7-10 show that *Capxrnd* is positively associated with the income shares held by the poorest 20% and 10% both in low and high *EF* countries. Panel B shows that the negative impact of *Capxrnd* on income inequality measures is mainly observed in low *GDP per capita* countries. *Capxrnd* and income inequality relations in high *GDP per capita* countries are statistically insignificant. These findings indicate that Capxrnd can help more in countries with low *GDP per capita* compared to countries with high *GDP per capita* to reduce income inequality.

{Insert Table 4}

4.3 Income inequality and capital expenditure conditioned on unemployment

Next, we examine how a country's unemployment rate affects the relation between income inequality and *Capxrnd*. We sort countries in our sample into two categories based on unemployment. Unemployment refers to the share of the labor force that is without work but available for and seeking employment. We also sort the countries in our sample into two categories

based on female and male unemployment rates. We estimate equation (1) in each subsample. Table 5 panel A reports the results in low and high unemployment subsamples. Models 1 and 2 show the estimated coefficients for *Capxrnd* are negative and statistically significant at 1% level. In terms of economic significance, one standard deviation shock to *Capxrnd* is associated with 4.40% (5.29%) reduction in Gini index during low (high) unemployment periods. Models 3-6 document that *Capxrnd* is negatively associated with the income held by the richest 10% and 20% during both low and high unemployment periods. Models 7-10 show that *Capxrnd* is positively associated with the income share held by the poorest 20% and 10% during both low and high unemployment periods. Panel B and C show that the negative relation between *Capxrnd* and inequality holds during low and high female and male unemployment periods as well. Overall, the results in Table 5 show that *Capxrnd* can reduce income inequality in countries both with low and high unemployment.

{Insert Table 5}

4.4 Income inequality and capital expenditure conditioned on the health of the banking sector

Since banking sector helps firms to finance their capital investments, the health of banking sector can affect the relation between *Capxrnd* and income inequality. Thus, in this section we examine the impact of firms' capital investment on income inequality conditioned on the health of the country's banking sector. We use three measures related to the health of banking sector: *Bank Z-Score, Lerner Index,* and *Banking Crisis*. We obtain these measures from the World Bank. *Bank Z-Score* compares the buffer of a country's banking system (capitalization and returns) with the volatility of those returns and captures the probability of default of a country's banking system. *Lerner Index* is a measure of market power in the banking market. Higher values of the *Lerner index* indicate less bank competition. *Banking Crisis* is set to 1 if there is a systematic banking

crisis in the country and zero otherwise. We divide our sample into two subsamples based on *Bank Z-Score*, *Lerner Index*, and *Banking Crisis* and estimate equation (1) in each subsample.

Table 6 summarizes the results for the income inequality and *Capxrnd* relationship conditioned on the health of baking sector. Panel A reports the results for low and high *Bank Z-Score* subsamples. In models 1 and 2, the estimated coefficients for *Caxprnd* are negative and statistically significant. Thus, *Capxrnd* decreases Gini index both in low and high *Bank Z-Score* periods. Models 3-6 document that *Capxrnd* is negatively associated with the income share held by the richest 10% and 20%. In models 7-10 the estimated coefficients for *Capxrnd* are positive and statistically significant, indicating a positive association between firms' capital investments and income share held by the poorest 20% and 10%. Panel B reports the results in low and high *Lerner index* subsamples. Consistent with our previous results, in all models the estimated coefficients for *Capxrnd* are negative and statistically significant. These findings indicate that firms' capital investments decrease income inequality regardless of competition in the banking sector. In panel C, we examine *Capxrnd* and income inequality relation conditioned on banking crisis, periods in which the banking system faces significant financial problems. In model 1, the estimated coefficient for *Capxrnd* is negative and statistically significant. This shows that when banking sector is not in serious trouble, firms' capital expenditures decrease income inequality. However, model 2 shows that *Capxrnd* and Gini index relation is statistically insignificant when there is a banking sector crisis. Thus, when the banking sector is having difficulties the negative impact of capital expenditure on income inequality disappears. The other models also document consistent findings with the results in models 1 and 2.

{Insert Table 6}

4.5 Poverty and capital expenditure multivariate regressions

Our results so far document that firm level capital investment reduces income inequality, next we further examine a possible reason for this negative relation. Specifically, we conjecture that by reducing poverty, capital expenditure can decrease income inequality. Firms' capital expenditure can improve living standards and provide better opportunities to the poor. Thus, firms' capital investments can negatively affect poverty. To examine capital expenditure and poverty relation we estimate the following equation using pooled-country year observations in an unbalanced panel:

$$\begin{aligned}\mathrm{Ln}(Poverty)_{i,t} = \beta_1 Capxrnd_{i,t} + \beta_2 Ln(BankCredit)_{i,t} + \beta_3 GDPgrowth_{i,t} \\ +\beta_4 Ln(Savings)_{i,t} + \beta_2 NetExport_{i,t} + \alpha_t + \varepsilon_{i,t}.\end{aligned} \quad (2)$$

The dependent variables are six measures of poverty. The first set of poverty measures focus on poverty gaps. Specifically, *PovGp190*, *PovGp320* and *PovGp510* are poverty gaps at $1.90, $3.20, and $5.50 a day, respectively. They represent the mean shortfall in income or consumption from the poverty line $1.90, $3.20, and $5.50 a day expressed as a percentage of the poverty line. These measures reflect the depth of poverty as well as its incidence. The second set of poverty measures reflect poverty headcounts. *PovHcr190*, *PovHcr320*, and *PovHcr550* are poverty headcount ratios at $1.90, $3.20, and $5.50 a day. These ratios show the percentages of the population living on less than $1.90, $3.20, and $5.50 a day. The main variable of interest is the natural log of capital expenditure and R&D (*Capxrnd*). The control variables and all other specifications are same as previously defined.

Table 7 reports the results. In the first three models the dependent variables are natural logarithms of poverty gap measures. In models 1-3 the estimated coefficients for *Capxrnd* are negative and statistically significant at 1% level. In economic terms, one standard deviation increase in *Capxrnd* is associated with 16.98%, 26.85% and 30.20% reductions in poverty gaps at

$1.90, $3.20, and $5.50 a day, respectively. These findings show that firms' capital expenditures alleviate the intensity of poverty in a nation significantly. Models 4-6 show that *Capxrnd* is also negatively associated with poverty head count ratios. Specifically, one standard deviation increase in *Capxrnd* is associated with 23.74%, 30.43%, and 29.75% decrease in poverty headcount ratios at $1.90, $3.20, and $5.50 a day. These results indicate that firms' capital investment decrease the percentage of population suffering from poverty significantly. Overall, the findings in Table 7 show that firm level capital expenditure is negatively associated with true poverty and support our main hypothesis that firm level capital expenditure decreases income inequality.

{Insert Table 7}

5. Conclusion

In this paper, we examine the role that firm-level investment (capital expenditures and R&D) can have on inequalities and poverty within countries. Governments around the world are wrestling with income inequality, and what to do about it. At the same time, there have also been significant changes in capital expenditures by firms in recent years. After a period of stagnant investment trend, firms engaged in an investment boom after the first few months of the pandemic. All these are transpiring at a time when there is also much discussion regarding loopholes in corporate tax systems and lost tax revenue due to profit shifting by corporations. There is expectation of corporate tax reform in many countries, including the U.S. that will likely be a coordinated effort. As policy makers contemplate whether policy tools such as taxes/subsidies and/or regulation can help curb inequalities, our results suggest that any such action should be multifaceted, taking into consideration the importance of firm investment for economies and the role it plays in mitigating inequalities and poverty.

While we recognize that more research is needed on this important topic, our paper documents interesting findings that firms can play an important role in reducing inequalities within a country. Our results suggest that increases in firm-level investments are negatively associated with income inequality and poverty. The results seem to have an intuitive economic explanation; as firm-level investment increases, it is likely to increase firm demand for labor, which could increase income, and as our results suggest this effect is most impactful for those on the lower end of the income distribution. Our results are robust to several country-level controls such as bank credit, GDP growth, the amount of savings, and the net exports. Furthermore, we document several interesting cross-sectional findings. In the majority of our subsample analyses, we find that firm-level investment is associated with a reduction in inequality. We also find that this impact is usually driven by increasing income at the lower end of the income distribution. Furthermore, when we consider the poverty gap, we find that firm investment is associated with reducing the poverty gap. Overall, our results suggest that policy makers would be well served to consider actions that encourage firm investment. For instance, a policy reform that involves measures to close corporate tax loopholes could be combined with a support mechanism for firm investment.

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Table 1

Descriptive Statistics and Pearson Correlations. The table reports the descriptive statistics and Pearson correlation coefficients of main variables used in our analysis. Gini is the World Bank Gini index that measures the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution. Inc90 is the income share held by the richest 10%. Inc80 is the income share held by the richest 20%. Inc20 is the income share held by the poorest 20%. Inc10 is the income share held by the poorest 10%. CAPEX is the capital expenditure scaled by beginning-of-year total assets. Firm level capital expenditure is equally weighted at country level. (E.g., similar to Jin and Myers, 2006). CAPEXRND is the sum of capital expenditure and R&D expenses scaled by beginning-of-year total assets. Firm level capital expenditure and R&D are equally weighted at country level. (E.g., similar to Jin and Myers, 2006). BankCredit is the domestic credit to private sector by banks (% of GDP). GDPgrowth is the GDP growth (annual %). Savings is country level gross savings (% of GDP). NetExport is the difference between exports and imports (% of GDP). Detailed descriptions and sources are in Appendix A.1. The sample includes 87 countries and 321,284 firm year observations from 1979 to 2018. Variables are winsorized at 1% and 99%.

	Variable	Obs.	Mean	Stdev	1	2	3	4	5	6	7	8	9	10	11
1	Ln(Gini)	928	3.5930	0.2371	1.0000										
2	Ln(Inc90)	928	3.3513	0.2247	0.9817	1.0000									
3	Ln(Inc80)	928	3.7840	0.1634	0.9916	0.9966	1.0000								
4	Ln(Inc20)	928	1.8374	0.3917	-0.9412	-0.9036	-0.9256	1.0000							
5	Ln(Inc10)	928	0.8460	0.5196	-0.8552	-0.8056	-0.8305	0.9675	1.0000						
6	Capex	928	0.0670	0.0303	0.0649	0.0853	0.0810	-0.0044	0.0386	1.0000					
7	Capexrnd	928	0.0749	0.0322	-0.0711	-0.0620	-0.0625	0.1020	0.1270	0.9068	1.0000				
8	Ln(BankCredit)	928	4.0081	0.7741	-0.3744	-0.3861	-0.3839	0.3451	0.3162	-0.2650	-0.1019	1.0000			
9	GDPgrowth	928	3.1941	3.6973	0.1820	0.1918	0.1890	-0.1140	-0.0706	0.2948	0.2280	-0.2256	1.0000		
10	Ln(Savings)	928	3.0699	0.3925	-0.1223	-0.1253	-0.1170	0.1413	0.1468	0.1216	0.1581	0.0778	0.2570	1.0000	
11	NetExport	928	0.6608	8.8040	-0.2235	-0.2316	-0.2235	0.1898	0.1724	-0.0618	0.0079	0.1748	-0.0636	0.4274	1.0000

Table 2

Multivariate Regressions- Income Inequality and Capexrnd. The table reports the results from estimating the following equality using our pooled (Country-Year) sample.

$$\text{Ln}\ (Inequality)_{i,t} = \beta_1 Capxrnd_{i,t} + \beta_2 Ln(BankCredit)_{i,t} + \beta_3 GDPgrowth_{i,t} + \beta_4 Ln(Savings)_{i,t} + \beta_2 NetExport_{i,t} + \alpha_t + \varepsilon_{i,t}$$

The dependent variables include natural logarithm of our five inequality measures. Gini is the World Bank Gini index that measures the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution. Inc90 is the income share held by the richest 10%. Inc80 is the income share held by the richest 20%. Inc20 is the income share held by the poorest 20%. Inc10 is the income share held by the poorest 10%. Main variable of interest is CAPEXRND, the sum of capital expenditure and R&D expenses scaled by beginning-of-year total assets. Firm level capital expenditure and R&D are equally weighted at country level (e.g., similar to Jin and Myers, 2006). The other control variables include following: the natural log of BankCredit, GDPgrowth, the natural log of Savings, and NetExport. Detailed descriptions and sources are in Appendix A.1. In panel A, we summarize the results of our main model specifications. In model variation, Panel B, we lag all independent variables one year. All other model specifications are the same as the Panel A. All models include year fixed effect. *t*-statistics based on standard errors clustered by country are reported in the parentheses. ∗, ∗∗, and ∗∗∗ represent statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Main model specifications					
	(1)	(2)	(3)	(4)	(5)
Variables	Ln(Gini)	Ln(Inc90)	Ln(Inc80)	Ln(Inc20)	Ln(Inc10)
Capxrnd	-1.4550***	-1.3626***	-1.0014***	2.7275***	4.1686***
	(-3.27)	(-3.38)	(-3.38)	(3.45)	(3.49)
Ln(BankCredit)	-0.0805***	-0.0764***	-0.0558***	0.1280***	0.1621**
	(-3.18)	(-3.54)	(-3.42)	(2.65)	(2.36)
GDPgrowth	0.0120**	0.0118***	0.0084***	-0.0132	-0.0104
	(2.58)	(2.81)	(2.70)	(-1.57)	(-0.92)
Ln(Savings)	-0.0377	-0.0374	-0.0243	0.0873	0.0746
	(-0.89)	(-0.98)	(-0.86)	(1.19)	(0.74)
NetExport	-0.0030	-0.0030	-0.0021	0.0028	0.0042
	(-1.48)	(-1.63)	(-1.52)	(0.70)	(0.70)
Constant	4.0846***	3.7728***	4.1043***	0.8843***	-0.3122
	(23.42)	(24.60)	(35.87)	(2.80)	(-0.69)
Observations	928	928	928	928	926
R-squared	0.2957	0.3230	0.3144	0.2689	0.2434
Year FE	YES	YES	YES	YES	YES
Clustered SE	YES	YES	YES	YES	YES
Panel B: Alternative models with lagged variables					
	(1)	(2)	(3)	(4)	(5)
Variables	Ln(Gini)	Ln(Inc90)	Ln(Inc80)	Ln(Inc20)	Ln(Inc10)

Lagged Capxrnd	-1.3200**	-1.2540***	-0.9209***	2.2927***	3.4506***
	(-3.26)	(-3.23)	(-3.31)	(3.39)	(3.47)
Lagged Controls	Yes	Yes	Yes	Yes	Yes
Observations	909	909	909	909	907
R-squared	0.2835	0.3102	0.3030	0.2630	0.2320
Year FE	YES	YES	YES	YES	YES
Clustered SE	YES	YES	YES	YES	YES

Table 3

Multivariate Regressions- Income Inequality and Capex. The table reports the results from estimating the following equality using our pooled (Country-Year) sample.

$$\text{Ln}\,(Inequality)_{i,t} = \beta_1 Capex_{i,t} + \beta_2 Ln(BankCredit)_{i,t} + \beta_3 GDPgrowth_{i,t} + \beta_4 Ln(Saving)_{i,t} + \beta_2 NetExport_{i,t} + \alpha_t + \varepsilon_{i,t}$$

The dependent variables include natural logarithm of our five inequality measures. Gini is the World Bank Gini index that measures the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution. Inc90 is the income share held by the richest 10%. Inc80 is the income share held by the richest 20%. Inc20 is the income share held by the poorest 20%. Inc10 is the income share held by the poorest 10%. Main variable of interest is CAPEX, the capital expenditure expenses scaled by beginning-of-year total assets. Firm level capital expenditures are equally weighted at country level (e.g., similar to Jin and Myers, 2006). The other control variables include following: the natural log of BankCredit, GDPgrowth, the natural log of Savings, and NetExport. Detailed descriptions and sources are in Appendix A.1. In panel A, we summarize the results of our main model specifications. In model variation, Panel B, we lag all independent variables one year. All other model specifications are the same as the Panel A. All models include year fixed effect. *t*-statistics based on standard errors clustered by country are reported in the parentheses. ∗, ∗∗, and ∗∗∗ represent statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Main model specifications

	(1)	(2)	(3)	(4)	(5)
Variables	Ln(Gini)	Ln(Inc90)	Ln(Inc80)	Ln(Inc20)	Ln(Inc10)
Capex	-1.0734**	-0.9186**	-0.6986**	2.6287***	4.0569***
	(-2.28)	(-2.16)	(-2.23)	(2.99)	(3.06)
Ln(BankCredit)	-0.0858***	-0.0807***	-0.0591***	0.1426***	0.1848**
	(-3.25)	(-3.56)	(-3.46)	(2.85)	(2.57)
GDPgrowth	0.0120**	0.0116***	0.0083***	-0.0139	-0.0117
	(2.55)	(2.75)	(2.64)	(-1.62)	(-1.02)
Ln(Savings)	-0.0436	-0.0437	-0.0287	0.0931	0.0880
	(-1.00)	(-1.10)	(-0.98)	(1.24)	(0.85)
NetExport	-0.0031	-0.0031	-0.0022	0.0031	0.0046
	(-1.50)	(-1.65)	(-1.55)	(0.77)	(0.76)
Constant	4.0594***	3.7424***	4.0838***	0.8837***	-0.3309
	(22.84)	(24.02)	(35.15)	(2.75)	(-0.70)
Observations	928	928	928	928	926
R-squared	0.2806	0.3062	0.2979	0.2607	0.2337
Year FE	YES	YES	YES	YES	YES
Clustered SE	YES	YES	YES	YES	YES

Panel B: Alternative models with lagged variables

	(1)	(2)	(3)	(4)	(5)
Variables	Ln(Gini)	Ln(Inc90)	Ln(Inc80)	Ln(Inc20)	Ln(Inc10)
Lagged Capex	-0.9546**	-0.8442**	-0.6381**	2.0741***	3.2479***
	(-2.26)	(-2.10)	(-2.22)	(2.82)	(2.99)
Lagged Controls	Yes	Yes	Yes	Yes	Yes

Observations	909	909	909	909	907
R-squared	0.2684	0.2934	0.2866	0.2539	0.2230
Year FE	YES	YES	YES	YES	YES
Clustered SE	YES	YES	YES	YES	YES

Table 4

Inequality and Capexrnd conditioned on economic fitness and GDP. The table reports the results from estimating the following equality using our pooled (Country-Year) sample.

$$\text{Ln } (Inequality)_{i,t} = \beta_1 Capxrnd_{i,t} + \beta_2 Ln(BankCredit)_{i,t} + \beta_3 GDPgrowth_{i,t} + \beta_4 Ln(Saving)_{i,t} + \beta_2 NetExport_{i,t} + \alpha_t + \varepsilon_{i,t}$$

The dependent variables include natural logarithm of our five inequality measures and the other control variables are the natural log of BankCredit, GDPgrowth, the natural log of Savings, and NetExport. Detailed descriptions and sources are in Appendix A.1. In Panel A, we sort the countries in our sample into two categories based on Economic Fitness. Economic Fitness (EF) is both a measure of a country's diversification and ability to produce complex goods on a globally competitive basis. Countries with the highest levels of EF have capabilities to produce a diverse portfolio of products, ability to upgrade into ever-increasing complex goods, tend to have more predictable long-term growth, and to attain good competitive position relative to other countries. Countries with low EF levels tend to suffer from poverty, low capabilities, less predictable growth, low value-addition, and trouble upgrading and diversifying faster than other countries. In Panel B, we sort the countries in our sample into two categories based on GDP/Capita. All models include year fixed effect. *t*-statistics based on standard errors clustered by country are reported in the parentheses. ∗, ∗∗, and ∗∗∗ represent statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Low and high economic fitness subsamples

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	(Low EF)	(High EF)	(Low EF)	(High EF)	(Low EF)	(High EF)	(Low EF)	(High EF)	(Low EF)	(High EF)
Variables	Ln(Gini)	Ln(Gini)	Ln(Inc90)	Ln(Inc90)	Ln(Inc80)	Ln(Inc80)	Ln(Inc20)	Ln(Inc20)	Ln(Inc10)	Ln(Inc10)
Capxrnd	-1.6672***	-2.3352***	-1.4708***	-2.0646***	-1.1088***	-1.5460***	4.2327***	2.8385**	6.4326***	3.7567**
	(-3.22)	(-2.91)	(-3.00)	(-3.25)	(-3.14)	(-3.18)	(4.00)	(2.51)	(3.69)	(2.61)
Ln(BankCredit)	-0.1109***	-0.0010	-0.0966***	-0.0120	-0.0723***	-0.0057	0.1714***	0.0234	0.2250**	0.0289
	(-3.54)	(-0.02)	(-3.59)	(-0.31)	(-3.51)	(-0.21)	(2.65)	(0.42)	(2.41)	(0.43)
GDPgrowth	0.0037	0.0262***	0.0044	0.0243***	0.0029	0.0177***	-0.0015	-0.0321**	0.0047	-0.0317*
	(0.81)	(3.22)	(1.07)	(3.39)	(0.95)	(3.29)	(-0.20)	(-2.36)	(0.46)	(-1.89)
Ln(Savings)	0.0042	-0.0605	-0.0075	-0.0556	0.0010	-0.0352	-0.0203	0.1304	-0.0455	0.1817
	(0.09)	(-0.71)	(-0.19)	(-0.70)	(0.04)	(-0.60)	(-0.23)	(0.93)	(-0.36)	(1.05)
NetExport	-0.0026	-0.0092*	-0.0025	-0.0067	-0.0017	-0.0053	0.0018	0.0137	0.0024	0.0193*
	(-0.92)	(-1.76)	(-1.07)	(-1.43)	(-0.97)	(-1.52)	(0.30)	(1.64)	(0.27)	(1.90)
Constant	4.2700***	3.8550***	3.9826***	3.6342***	4.2396***	3.9727***	0.5248	1.1629*	-1.1243**	-0.0897
	(26.72)	(9.78)	(28.90)	(9.47)	(40.86)	(14.13)	(1.61)	(1.74)	(-2.41)	(-0.12)
Observations	360	363	360	363	360	363	360	363	360	363
R-squared	0.3051	0.3263	0.0.3172	0.3366	0.3095	0.3363	0.2922	0.3292	0.2865	0.3293
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Clustered SE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Panel B: Low and high GDP per capita subsamples

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	(Low GDP)	(High GDP)	(Low GDP)	(High GDP)	(Low GDP)	(High GDP)	(Low GDP)	(High GDP)	(Low GDP)	(High GDP)

Variables	Ln(Gini)	Ln(Gini)	Ln(Inc90)	Ln(Inc90)	Ln(Inc80)	Ln(Inc80)	Ln(Inc20)	Ln(Inc20)	Ln(Inc10)	Ln(Inc10)
Capxrnd	-0.9951**	-0.1709	-0.9049**	-0.1067	-0.6692**	-0.0877	2.4718**	0.5604	3.8338***	1.2897
	(-2.05)	(-0.20)	(-2.04)	(-0.17)	(-2.05)	(-0.18)	(2.45)	(0.45)	(2.50)	(0.81)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	450	458	450	458	450	458	450	458	450	458
R-squared	0.1318	0.2004	0.1546	0.2035	0.1453	0.1998	0.1503	0.2116	0.1598	0.2183
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Clustered SE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

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Table 5

Income Inequality and Capexrnd conditioned on unemployment. The table reports the results from estimating the following equality using our pooled (Country-Year) sample.

$$\text{Ln}\,(Inequality)_{i,t} = \beta_1 Capxrnd_{i,t} + \beta_2 Ln(BankCredit)_{i,t} + \beta_3 GDPgrowth_{i,t} + \beta_4 Ln(Saving)_{i,t} + \beta_2 NetExport_{i,t} + \alpha_t + \varepsilon_{i,t}$$

The dependent variables include natural logarithm of our five inequality measures and the other control variables are the natural log of BankCredit, GDPgrowth, the natural log of Savings, and NetExport. Detailed descriptions and sources are in Appendix A.1. In Panel A, we sort the countries in our sample into two categories based on Unemployment, total (% of total labor force). Unemployment refers to the share of the labor force that is without work but available for and seeking employment In Panels B and C, we sort the countries in our sample into two categories based on female and male unemployment rates. All models include year fixed effect. *t*-statistics based on standard errors clustered by country are reported in the parentheses. ∗, ∗∗, and ∗∗∗ represent statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Impact during low and high unemployment in the country.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	(Low Unemp.)	(High Unemp)	(Low Unemp.)	(High Unemp)	(Low Unemp.)	(High Unemp)	(Low Unemp.)	(High Unemp)	(Low Unemp.)	(High Unemp)
Variables	Ln(Gini)	Ln(Gini)	Ln(Inc90)	Ln(Inc90)	Ln(Inc80)	Ln(Inc80)	Ln(Inc20)	Ln(Inc20)	Ln(Inc10)	Ln(Inc10)
Capxrnd	-1.3975***	-1.6893***	-1.3727**	-1.573**	-0.9892**	-1.1510**	2.1942**	37054***	2.5701*	5.8843***
	(-2.40)	(-2.87)	(-2.75)	(-2.78)	(-2.63)	(-2.85)	(2.07)	(3.69)	(1.81)	(3.77)
Ln(BankCredit)	-0.0654*	-0.1091***	-0.0696**	-0.0918***	-0.0479*	-0.0715***	0.0697	0.2146***	0.0655	0.2969***
	(-1.79)	(-4.15)	(-2.17)	(-3.86)	(-2.00)	(-4.15)	(1.06)	(4.78)	(0.75)	(4.21)
GDPgrowth	0.0199***	0.0049	0.0182***	0.0056	0.0135***	0.0038	-0.0268**	-0.0014	-0.0290*	0.0049
	(3.11)	(1.19)	(3.26)	(1.45)	(3.19)	(1.33)	(-2.27)	(-0.23)	(-1.82)	(0.65)
Ln(Savings)	0.0119	-0.0915	0.0015	-0.0821	0.0079	-0.0602	-0.0174	0.1529	-0.0195	0.1829
	(0.23)	(-1.37)	(0.04)	(-1.26)	(0.25)	(-1.27)	(-0.21)	(1.37)	(-0.17)	(1.33)
NetExport	-0.0055*	0.0002	-0.0051**	-0.0003	-0.0037*	-0.0003	0.0093	-0.0046	0.0137	-0.0080
	(-1.85)	(0.06)	(-2.15)	(-0.12)	(-1.97)	(-0.02)	(1.46)	(-1.16)	(1.47)	(-1.60)
Constant	3.9569***	4.4213***	3.7370***	4.0308***	4.0488***	4.3152***	1.0155**	0.2275	-0.4658	-1.4018**
	(19.25)	(17.83)	(21.81)	(16.98)	(31.31)	(25.26)	(2.16)	(0.55)	(-0.57)	(-2.49)
Observations	451	454	451	454	451	454	451	454	451	454
R-squared	0.3550	0.3402	0.4088	0.3419	0.3888	0.3467	0.2917	0.3864	0.2728	0.3968
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Clustered SE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Panel B: Impact during low and high female unemployment in the country.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	(Low Funemp.)	(High Funemp)	(Low Funemp.)	(High Funemp)	(Low Funemp.)	(High Funemp)	(Low Funemp.)	(High Funemp)	(Low Funemp.)	(High Funemp)
Variables	Ln(Gini)	Ln(Gini)	Ln(Inc90)	Ln(Inc90)	Ln(Inc80)	Ln(Inc80)	Ln(Inc20)	Ln(Inc20)	Ln(Inc10)	Ln(Inc10)

Capxrnd	-1.4539**	-1.5522***	-1.4641***	-1.4409***	-1.0460***	-1.0638***	2.3059**	3.3849***	2.7081*	5.3091***
	(-2.39)	(-2.80)	(-2.83)	(-2.79)	(-2.70)	(-2.86)	(2.13)	(3.18)	(1.86)	(3.16)
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	451	454	451	454	451	454	451	454	451	454
R-squared	0.3767	0.3335	0.4237	0.3334	0.4084	0.3351	0.3179	0.3665	0.2909	0.3771
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Clustered SE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Panel C: Impact during low and high male unemployment in the country.										
Variables	(Low Munemp.) Ln(Gini)	(High Munemp) Ln(Gini)	(Low Munemp.) Ln(Inc90)	(High Munemp) Ln(Inc90)	(Low Munemp.) Ln(Inc80)	(High Munemp) Ln(Inc80)	(Low Munemp.) Ln(Inc20)	(High Munemp) Ln(Inc20)	(Low Munemp.) Ln(Inc10)	(High Munemp) Ln(Inc10)
Capxrnd	-1.6080**	-1.5131**	-1.5589***	-1.4486**	-1.1301***	-1.0498**	2.5443**	3.4467***	3.0524*	5.5618***
	(-2.57)	(-2.50)	(-2.96)	(-2.54)	(-2.81)	(-2.56)	(2.19)	(3.33)	(1.92)	(3.47)
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	452	453	452	453	452	453	452	453	452	453
R-squared	0.3439	0.3522	0.4054	0.3483	0.3809	0.3548	0.2778	0.3984	0.2621	0.4059
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Clustered SE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table 6

Income Inequality and Capexrnd conditioned on the health of banking sector. The table reports the results from estimating the following equality using our pooled (Country-Year) sample.

$$\text{Ln } (Inequality)_{i,t} = \beta_1 Capxrnd_{i,t} + \beta_2 Ln(BankCredit)_{i,t} + \beta_3 GDPgrowth_{i,t} + \beta_4 Ln(Saving)_{i,t} + \beta_2 NetExport_{i,t} + \alpha_t + \varepsilon_{i,t}$$

The dependent variables include natural logarithm of our five inequality measures and the other control variables are the natural log of BankCredit, GDPgrowth, the natural log of Savings, and NetExport. Detailed descriptions and sources are in Appendix A.1. In Panel A, we sort the countries in our sample into two categories based on Bank Z-Score. Bank Z-Score captures the probability of default of a country's banking system. In Panels B, we sort the countries in our sample into two categories based on Lerner Index. Lerner Index is a measure of market power in the banking market. Higher values of the Lerner index indicate less bank competition. In Panel C, we divide our sample into two subsamples based on Banking Crisis binary variable (1=Banking Crisis, 0=None). All models include year fixed effect. *t*-statistics based on standard errors clustered by country are reported in the parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Low vs. High Bank Z-Score subsamples

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	(Low Zscore)	(High Zscore)	(Low Zscore)	(High Zscore)	(Low Zscore)	(High Zscore)	(Low Zscore)	(High Zscore)	(Low Zscore)	(High Zscore)
Variables	Ln(Gini)	Ln(Gini)	Ln(Inc90)	Ln(Inc90)	Ln(Inc80)	Ln(Inc80)	Ln(Inc20)	Ln(Inc20)	Ln(Inc10)	Ln(Inc10)
Capxrnd	-2.1113***	-1.2256 **	-1.9382**	-1.1793**	-1.4151**	-0.8720**	3.3245***	2.8298**	4.4106***	4.1561**
	(-2.75)	(-2.33)	(-2.58)	(-2.60)	(-2.61)	(-2.55)	(2.84)	(2.52)	(2.85)	(2.37)
Ln(BankCredit)	-0.0922**	-0.0892**	-0.0778**	-0.0927***	-0.0606**	-0.0633***	0.1718***	0.1243*	0.2180***	0.1652
	(-2.55)	(-2.65)	(-2.58)	(-3.20)	(-2.63)	(-2.90)	(2.95)	(1.88)	(2.94)	(1.62)
GDPgrowth	0.0087	0.0145**	0.0085*	0.0141**	0.0059	0.0104**	-0.0046	-0.0186	-0.0013	-0.0129
	(1.58)	(2.05)	(1.70)	(2.23)	(1.64)	(2.17)	(-0.61)	(-1.34)	(-0.14)	(-0.68)
Ln(Savings)	-0.0138	-0.0469	-0.0061	-0.0506	-0.0020	-0.0350	0.0610	0.0619	0.1188	0.0354
	(-0.27)	(-0.80)	(-0.15)	(-0.90)	(-0.06)	(-0.84)	(0.77)	(0.58)	(1.05)	(0.25)
NetExport	-0.0046	-0.0013	-0.0042	-0.0016	-0.0030	-0.0010	0.0058	0.0001	0.0072	0.0003
	(-1.57)	(-0.60)	(-1.66)	(-0.74)	(-1.59)	(-0.65)	(1.34)	(0.02)	(1.27)	(0.03)
Constant	4.3306***	4.3360***	4.0182***	4.1291***	4.2687***	4.3321***	0.4696	0.6035	-1.0563	-0.6666
	(18.05)	(13.64)	(19.69)	(13.90)	(27.44)	(19.41)	(1.04)	(1.01)	(-1.63)	(-0.90)
Observations	422	425	422	425	422	425	422	425	422	425
R-squared	0.3160	0.3331	0.3207	0.3703	0.3254	0.3545	0.3516	0.2945	0.3418	0.2724
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Clustered SE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Panel B Low vs High Lerner index in the country.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	(Low Lerner)	(High Lerner)	(Low Lerner)	(High Lerner)	(Low Lerner)	(High Lerner)	(Low Lerner)	(High Lerner)	(Low Lerner)	(High Lerner)
Variables	Ln(Gini)	Ln(Gini)	Ln(Inc90)	Ln(Inc90)	Ln(Inc80)	Ln(Inc80)	Ln(Inc20)	Ln(Inc20)	Ln(Inc10)	Ln(Inc10)

Capxrnd	-1.1372*	-1.7220**	-1.1542**	-1.5461**	-.8285**	-1.1539**	1.9088*	3.8847***	2.8315*	5.5531**
	(-1.94)	(-2.43)	(-2.24)	(-2.36)	(-2.16)	(-2.40)	(1.92)	(2.68)	(1.93)	(2.48)
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	319	320	319	320	319	320	319	320	319	320
R-squared	0.3233	0.3231	0.3560	0.3446	0.3446	0.3368	0.3355	0.2864	0.3238	0.2816
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Clustered SE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Panel C: Banking Crisis subsamples										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	(No crisis)	(Crisis)	(No crisis)	(Crisis)	(No crisis)	(Crisis)	(No crisis)	(Crisis)	(No crisis)	(Crisis)
Variables	Ln(Gini)	Ln(Gini)	Ln(Inc90)	Ln(Inc90)	Ln(Inc80)	Ln(Inc80)	Ln(Inc20)	Ln(Inc20)	Ln(Inc10)	Ln(Inc10)
Capxrnd	-1.4072***	-1.4937	-1.2879***	-1.3084	-0.9554***	-1.0045	2.8192***	2.8016	4.0111***	3.9047
	(-3.01)	(-0.97)	(-3.06)	(-1.03)	(-3.08)	(-1.06)	(3.23)	(1.22)	(3.19)	(1.27)
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	789	126	789	126	789	126	789	126	789	126
R-squared	0.2871	0.5628	0.1904	0.6241	0.2998	0.6084	0.2503	0.6115	0.2297	0.4521
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Clustered SE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table 7

Multivariate Regressions- Poverty and Capexrnd. The table reports the results from estimating the following equation using our pooled (Country-Year) sample.

$$\text{Ln}\,(Poverty)_{i,t} = \beta_1 Capxrnd_{i,t} + \beta_2 Ln(BankCredit)_{i,t} + \beta_3 GDPgrowth_{i,t} + \beta_4 Ln(Saving)_{i,t} + \beta_2 NetExport_{i,t} + \alpha_t + \varepsilon_{i,t}$$

The dependent variables include natural logarithm of our six poverty measures. PovGp190 (320) [550] is the poverty gap at \$1.90 (\$3.20) [\$5.50] a day (2011 PPP) defined as the mean shortfall in income or consumption from the poverty line \$1.90 (\$3.20) [\$5.50] a day expressed as a percentage of the poverty line. These measures reflect the depth of poverty as well as its incidence. PovHcr190 (320) [550] is the poverty headcount ratio at \$1.90 (\$3.20) [\$5.50] a day defined as the percentage of the population living on less than \$1.90 (\$3.20) [\$5.50] a day at 2011 international prices. The other control variables are the natural log of BankCredit, GDPgrowth, the natural log of Savings, and NetExport. Detailed descriptions and sources are in Appendix A.1. All models include year fixed effect. *t*-statistics based on standard errors clustered by country are reported in the parentheses. ∗, ∗∗, and ∗∗∗ represent statistical significance at the 10%, 5%, and 1% level, respectively.

	Poverty gap proxies: Models 1, 2, and 3			Poverty headcount ratios: Models 4, 5, and 6		
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Ln(PovGp190)	Ln(PovGp320)	Ln(PovGp550)	Ln(PovHcr190)	Ln(PovHcr320)	Ln(PovHcr550)
Capxrnd	-5.7775***	-9.7136***	-11.1667***	-8.4159***	-11.2707***	-10.9667***
	(-2.65)	(-3.98)	(-4.56)	(-3.29)	(-4.30)	(-4.17)
Ln(BankCredit)	-1.0182***	-1.0989***	-1.2795***	-1.2638***	-1.2863***	-1.3905***
	(-6.44)	(-6.12)	(-6.65)	(-7.78)	(-6.75)	(-6.66)
GDPgrowth	0.0198	0.0874***	0.1171***	0.0559*	0.1148***	0.1206***
	(0.74)	(2.90)	(3.44)	(1.79)	(3.42)	(3.24)
Ln(Savings)	0.0733	0.2058	0.4278	0.2597	0.4681	0.5047
	(0.30)	(0.73)	(1.42)	(0.920	(1.54)	(1.53)
NetExport	-0.0255	-0.0447***	-0.0586***	-0.0378**	-0.0588***	-0.0659***
	(-1.56)	(-2.92)	(-4.93)	(-2.19)	(-4.47)	(-5.66)
Constant	3.0851**	3.2915**	4.2473***	4.3609***	4.1695***	5.3085***
	(2.56)	(2.55)	(3.15)	(3.08)	(3.01)	(3.72)
Observations	714	814	888	784	875	917
R-squared	0.4663	0.5193	0.5419	0.5275	0.5426	0.5464
Year FE	YES	YES	YES	YES	YES	YES
Clustered SE	YES	YES	YES	YES	YES	YES

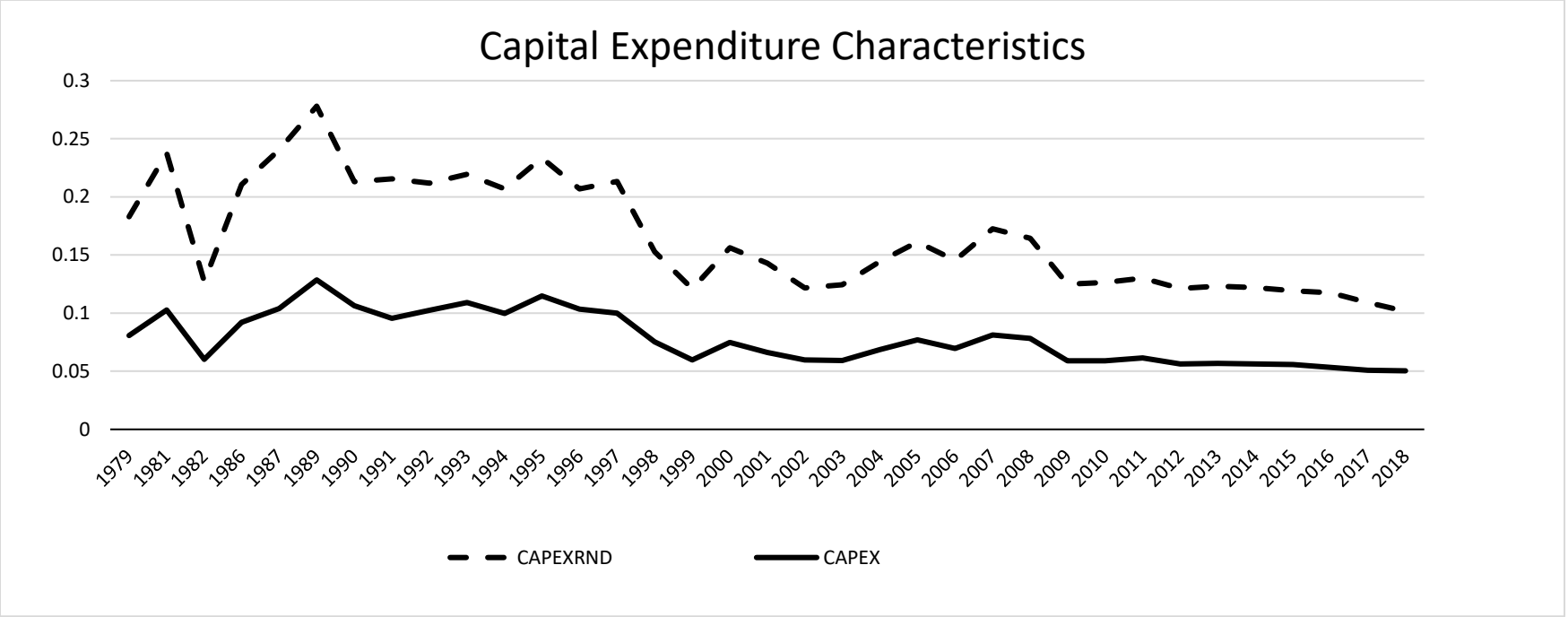

Fig. 1. The figure shows the capital expenditure characteristics for the average country in our sample across the time period when the data was available.

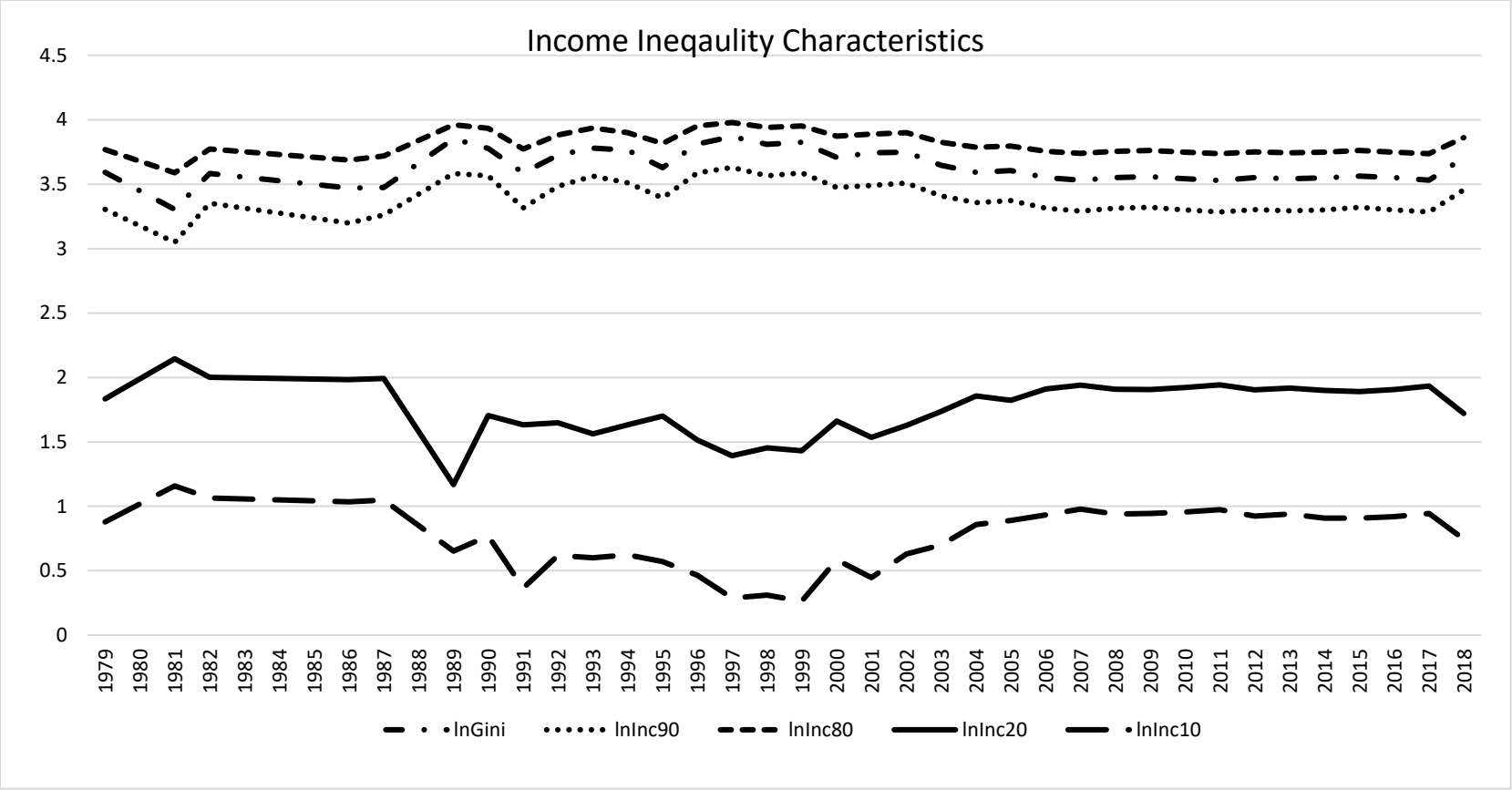

Fig. 2. The figure shows the Income Inequality characteristics for the average country in our sample across the time period when the data was available.

INTERNET APPENDIX

Appendix A.1.

Variable Definitions

Variables	Definition	Source
Gini	Gini index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution.	World Bank
Inc90	Income share held by the richest 10%.	World Bank
Inc80	Income share held by the richest 20%.	World Bank
Inc20	Income share held by the poorest 20%.	World Bank
Inc10	Income share held by the poorest 10%.	World Bank
PovGp190	Poverty gap at $1.90 a day (2011 PPP) is the mean shortfall in income or consumption from the poverty line $1.90 a day expressed as a percentage of the poverty line. This measure reflects the depth of poverty as well as its incidence.	World Bank
PovGp320	Poverty gap at $3.20 a day (2011 PPP) is the mean shortfall in income or consumption from the poverty line $3.20 a day, expressed as a percentage of the poverty line. This measure reflects the depth of poverty as well as its incidence.	World Bank
PovGp550	Poverty gap at $5.50 a day (2011 PPP) is the mean shortfall in income or consumption from the poverty line $5.50 a day, expressed as a percentage of the poverty line. This measure reflects the depth of poverty as well as its incidence.	World Bank
PovHcr190	Poverty headcount ratio at $1.90 a day is the percentage of the population living on less than $1.90 a day at 2011 international prices.	World Bank
PovHcr320	Poverty headcount ratio at $3.20 a day is the percentage of the population living on less than $3.20 a day at 2011 international prices.	World Bank
PovHcr550	Poverty headcount ratio at $5.50 a day is the percentage of the population living on less than $5.50 a day at 2011 international prices.	World Bank
Savings	Gross savings (% of GDP). Gross savings are calculated as gross national income less total consumption, plus net transfers.	World Bank
BankCredit	Domestic credit to private sector by banks (% of GDP).	World Bank
GDPgrowth	GDP growth (annual %)	World Bank
NetExport	the difference between exports and imports (% of GDP).	World Bank
Capex	Capital expenditure scaled by beginning-of-year total assets. Firm level capital expenditure is equally weighted at country level. (E.g., similar to Jin and Myers, 2006).	Global Compustat

Capexrnd	The sum of capital expenditure and R&D expenses scaled by beginning-of-year total assets. Firm level capital expenditure and R&D are equally weighted at country level. (E.g., similar to Jin and Myers, 2006)	Global Compustat
CETR	Cash effective tax rate (ratio of tax paid to pre-tax income)	Global Compustat
Unemployment	Unemployment, total (% of total labor force). Unemployment refers to the share of the labor force that is without work but available for and seeking employment.	World Bank
Male unemployment	Unemployment, male (% of male labor force). Unemployment refers to the share of the labor force that is without work but available for and seeking employment.	World Bank
Female unemployment	Unemployment, female (% of female labor force). Unemployment refers to the share of the labor force that is without work but available for and seeking employment.	World Bank
Economic Fitness	Economic Fitness (EF) is both a measure of a country's diversification and ability to produce complex goods on a globally competitive basis. Countries with the highest levels of EF have capabilities to produce a diverse portfolio of products, ability to upgrade into ever-increasing complex goods, tend to have more predictable long-term growth, and to attain good competitive position relative to other countries. Countries with low EF levels tend to suffer from poverty, low capabilities, less predictable growth, low value-addition, and trouble upgrading and diversifying faster than other countries.	World Bank
Bank Z-Score	It captures the probability of default of a country's banking system. Z-score compares the buffer of a country's banking system (capitalization and returns) with the volatility of those returns. It is estimated as (ROA+(equity/assets))/sd(ROA); sd(ROA) is the standard deviation of ROA. ROA, equity, and assets are country-level aggregate figures calculated from underlying bank-by-bank unconsolidated data from Bankscope.	World Bank
Lerner Index	A measure of market power in the banking market. It is defined as the difference between output prices and marginal costs (relative to prices). Prices are calculated as total bank revenue over assets, whereas marginal costs are obtained from an estimated translog cost function with respect to output. Higher values of the Lerner index indicate less bank competition. Lerner Index estimations follow the methodology described in Demirgüç-Kunt and Martínez Pería (2010). Calculated from underlying bank-by-bank data from Bankscope.	World Bank
Banking Crisis Dummy	Banking Crisis Dummy (1=Banking Crisis, 0=None). A banking crisis is defined as systemic if two conditions are met: a. Significant signs of financial distress in the banking system (as indicated by significant bank runs, losses in the banking system, and/or bank liquidations), b. Significant banking policy intervention measures in response to significant losses in the banking system. The first year that both criteria are met is considered as the year when the crisis start becoming systemic. The end of a crisis is defined the year before both real GDP growth and real credit growth are positive for at least two consecutive years.	World Bank

Appendix A.2. Table 1

Multivariate Regressions- Income Inequality and CETR. The table reports the results from estimating the following equality using our pooled (Country-Year) sample.

$$\text{Ln}\,(Inequality)_{i,t} = \beta_1 CETR_{i,t} + \beta_2 Ln(BankCredit)_{i,t} + \beta_3 GDPgrowth_{i,t} + \beta_4 Ln(Savings)_{i,t} + \beta_2 NetExport_{i,t} + \alpha_t + \varepsilon_{i,t}$$

The dependent variables include natural logarithm of our five inequality measures. Gini is the World Bank Gini index that measures the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution. Inc90 is the income share held by the richest 10%. Inc80 is the income share held by the richest 20%. Inc20 is the income share held by the poorest 20%. Inc10 is the income share held by the poorest 10%. Main variable of interest is CETR, cash effective tax rate. Firm level capital expenditure and R&D are equally weighted at country level (e.g., similar to Jin and Myers, 2006). The other control variables include following: the natural log of BankCredit, GDPgrowth, the natural log of Savings, and NetExport. Detailed descriptions and sources are in Appendix A.1. In panel A, we summarize the results of our main model specifications. In model variation, Panel B, we lag all independent variables one year. All other model specifications are the same as the Panel A. All models include year fixed effect. t-statistics based on standard errors clustered by country are reported in the parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: Main model specifications

	(1)	(2)	(3)	(4)	(5)
Variables	Ln(Gini)	Ln(Inc90)	Ln(Inc80)	Ln(Inc20)	Ln(Inc10)
CETR	0.0104***	0.0078***	0.0061***	-0.0397***	-0.1709***
	(3.62)	(3.04)	(3.12)	(-6.71)	(-3.08)
Ln(BankCredit)	-0.0727***	-0.0692***	-0.0505***	0.1114**	0.1343*
	(-2.69)	(-3.03)	(-2.92)	-2.21	-1.98
GDPgrowth	0.0108**	0.0107**	0.0076**	-0.0106	-0.0083
	-2.33	-2.6	-2.46	(-1.26)	(-0.76)
Ln(Savings)	-0.0476	-0.047	-0.031	0.0966	0.0993
	(-1.06)	(-1.18)	(-1.04)	-1.26	-1.03
NetExport	-0.0033	-0.0032*	-0.0023	0.004	0.0053
	(-1.55)	(-1.68)	(-1.59)	-0.94	-0.85
Constant	3.8530***	3.5569***	3.9449***	1.3235***	0.2487
	-21.76	-23.11	-33.94	-3.96	-0.56
Observations	873	873	873	873	871
R-squared	0.2591	0.2839	0.2765	0.2565	0.2298
Year FE	YES	YES	YES	YES	YES
Clustered SE	YES	YES	YES	YES	YES
Panel B: Alternative models with lagged variables					

Variables	(1) Ln(Gini)	(2) Ln(Inc90)	(3) Ln(Inc80)	(4) Ln(Inc20)	(5) Ln(Inc10)
Lagged CETR	0.0086***	0.0061***	0.0048***	-0.0226***	-0.0509***
	(3.43)	(2.95)	(3.03)	(-4.37)	(-6.41)
Lagged Controls	Yes	Yes	Yes	Yes	Yes
Observations	612	612	612	612	611
R-squared	0.3613	0.3133	0.3254	0.3307	0.3504
Year FE	YES	YES	YES	YES	YES
Clustered SE	YES	YES	YES	YES	YES