

A Meta-Analytic Reassessment of the Effects of Inequality on Growth

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Summary. — This paper develops a meta-analysis of the empirical literature that estimates the effect of inequality on growth. It covers studies published in scientific journals during 1994–2014 that examine the impact on growth of inequality in income, land, and human capital distribution. We find traces of publication bias in this literature, as authors and journals are more willing to report and publish statistically significant findings, and the results tend to follow a predictable time pattern over time according to which negative and positive effects are cyclically reported. After correcting for these two forms of publication bias, we conclude that the high degree of heterogeneity of the reported effect sizes is explained by study conditions, namely the structure of the data, the type of countries included in the sample, the inclusion of regional dummies, the concept of inequality and the definition of income. In particular, our meta-regression analysis suggests that: cross-section studies systematically report a stronger negative impact than panel data studies; the effect of inequality on growth is negative and more pronounced in less developed countries than in rich countries; the inclusion of regional dummies in the growth regression of the primary studies considerably weakens such effect; expenditure and gross income inequality tend to lead to different estimates of the effect size; land and human inequality are more pernicious to subsequent growth than income inequality is. We also find that the estimation technique, the quality of data on income distribution, and the specification of the growth regression do not significantly influence the estimation of the effect sizes. These results provide new insights into the nature of the inequality–growth relationship and offer important guidelines for policy makers.

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1. INTRODUCTION

The question of how inequality influences economic growth and the process of development has gained considerable attention among economists. Over the last three decades, the literature on this topic has grown considerably, as a large number of theoretical and empirical studies have been produced in an attempt to formalize and test the effects of inequality on growth.

The theoretical literature has focused on exploring and modeling the transmission channels through which inequality affects growth. The most important channels refer to: credit constraints and impediments to human and physical capital accumulation (Banerjee & Newman, 1993; Galor & Zeira, 1993); expensive fiscal policies and excessive taxation (Alesina & Rodrik, 1994; Persson & Tabellini, 1994); sociopolitical instability (Alesina & Perotti, 1996); joint education and fertility decisions (Galor & Zang, 1997; Perotti, 1996); aggregate savings (Kaldor, 1956); and incentives to R&D (Foelmmi & Zweimuuler, 2006). While the savings and the R&D channels predict a positive impact of inequality on growth, the other channels imply a negative impact.¹

Within the empirical literature, two branches can be identified: one aiming to test the validity of the theoretical channels, and the other, more extensive, attempting to estimate the reduced-form relationship between inequality and growth. The results obtained so far are, however, not consistent. In particular, works estimating the reduced-form relationship have reached very different conclusions regarding both the direction and magnitude of the impact of inequality on growth. On the one hand, one group of studies finds empirical

support for a negative effect and, on the other hand, these findings are countered by an important number of studies reporting a positive or an ambiguous effect. In addition, the empirical works also differ with respect to several methodological issues, such as the countries and time span of the sample, the structure of the data, the estimation techniques, the concept of inequality, the specification of the growth regression, and the source and quality of the data on income distribution.

Neves and Silva (2014) have undertaken a comprehensive descriptive survey of the empirical literature on this topic, suggesting that some of the methodological differences are likely to influence the estimation of the inequality–growth relationship. Thus, these differences could be important elements accounting for the diversity in the studies' findings. In the present paper, we complement their survey by performing a meta-analysis of the empirical literature that estimates the reduced-form relationship between inequality and growth. A meta-analysis is a quantitative literature review method in which statistical procedures are used to combine results from different studies investigating the same research question. The aim is to identify patterns among results, sources of disagreement or other interesting relationships that may come to light in the context of multiple studies (Greenland & O'Rourke, 2008). In comparison with traditional literature reviews, meta-analysis has the advantage of summarizing the findings of the studies in a systematic way, thus eliminating subjectivity and reducing the chances of making wrong interpretations and drawing misleading review conclusions (Shadish, 1982).

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Used initially in medical and psychological research, meta-analysis has spread to other research fields and today it is used in several social sciences. In economics, it has come to be increasingly used in the last two decades, particularly in research fields where the empirical literature is far from being consensual (e.g., Ashenfelter, Harmon, & Oosterbeek, 1999; Benos & Zotou, 2014; Doucouliagos, 2005; Gorg & Strobl, 2001; Iwasaki & Tokunaga, 2014; Jarrell & Stanley, 2004; Stanley, 2004).

A meta-analysis of the empirical literature on the effects of inequality on growth is desirable essentially for two reasons. Firstly, it helps to understand the causes of the divergent results that this literature has generated over the years using a quantitative approach, thus providing a more objective analysis of the relationship between the two variables. Secondly, a correct assessment of the different mechanisms through which inequality influences economic growth and the circumstances under which they operate is crucial for correct policy guidance in this area. It allows policy-makers to have an unbiased representation of the variety of perspectives and alternative methods that coexist within this research field, helping to avoid ideologically based policies. This is a point of major relevance, especially considering that inequality has steadily increased in several developing and developed countries over the last three decades (Cingano, 2014; Roser & Cuaresma, 2014).

A meta-analysis of the empirical literature on the effects of inequality on growth has already been performed by Dominicus, Florax, and Groot (2008). This work represents an important starting point to identify and analyze the variation in the studies' results. The main conclusions are that differences in estimation methods, data quality, and sample coverage affect the magnitude of the estimated effect of inequality on growth. In particular, it should be stressed that: (i) the effect tends to be negative and more pronounced in less developed countries and in the long-run; (ii) when regional dummies and additional measures of inequality are added as moderator variables in the growth regressions of the primary studies, the effect of inequality on growth becomes considerably weaker; (iii) studies that use fixed effects estimators systematically report higher effects; (iv) the definition of income and the quality of the data on income distribution have also a significant impact on the outcomes.

In the present paper, we further contribute to the understanding of this empirical literature by extending and enriching Dominicus *et al.*'s (2008) meta-analysis in three important aspects. Firstly, we include in the meta-analysis more recent studies. The latest study considered in Dominicus *et al.* (2008) dates from 2006, and since then a substantial amount of empirical work has been produced. Noticeably, recent papers have questioned some of the assumptions of the previous studies and attempted to conciliate their apparently contradictory findings by showing that inequality may be growth-promoting in some circumstances and growth-hindering in others. Thus, the inclusion of these papers in the meta-analysis could launch some important new ideas about the way inequality influences growth. Secondly, while Dominicus *et al.* (2008) focus exclusively on income inequality, we also include studies using other concepts of inequality, namely inequality in land and human capital distribution that represent an important body of the related literature. Given that these three forms of inequality are different in their nature and are not necessarily correlated, it is possible that they influence growth in different ways and through different channels. Thirdly, we develop an extensive analysis of the effects of publication bias on this empirical literature. Publication bias has been generally recognized as an important threat to empirical

research and can assume different forms. Dominicus *et al.* (2008) have examined this problem in the inequality-growth empirical literature by testing for the presence of only one form of publication bias that is in the direction of the results. In addition, in their meta-regression estimation the presence of this form of bias was not corrected, which may have distorted the final results. Here we test for the presence of a larger number of forms of publication bias and, when necessary, employ the appropriate statistical methods to correct them.

Our meta-analysis reveals that publication bias is present in the inequality-growth empirical literature in two ways: (i) authors and journals are more willing to report and publish statistically significant results, which makes the empirical effect of inequality on growth seem larger than it actually is; (ii) the results of the studies tend to follow a predictable time pattern, according to which negative and positive effects are cyclically reported. After correcting for these two forms of publication bias, we find that the heterogeneity in the studies' results is partially explained by differences in the data structure, the type of countries considered, the concept of inequality and the definition of income. In particular, our meta-regression corroborates Dominicus *et al.*'s (2008) findings that the effect of inequality on growth is more severe in developing countries, weaker when regional dummies are included, and higher when gross income-based inequality is used. However, in contrast with Dominicus *et al.* (2008), we find the impact of inequality on growth significantly influenced by the data structure (negative and stronger in cross-section studies than in panel studies), but not by estimation techniques or the quality of income distribution data. In addition, the inclusion in the meta-analysis of studies in which inequality is defined based on concepts other than income allows us to derive an important new conclusion, namely that land and human capital inequality appears to exert a stronger negative impact on growth than income inequality does. These results provide new insights into the nature of the inequality-growth relationship and additional guidelines for policy makers.

This paper is set out as follows. The next section presents a brief review of the empirical literature on the reduced-form relationship between inequality and growth. Section 3 provides a description of the studies used in the meta-analysis and a detailed explanation of the criteria for their selection. In Section 4 we present a preliminary analysis of the meta-data. Section 5 assesses the issue of publication bias. In Section 6 we perform meta-regression analysis to explain heterogeneity in the studies' findings and Section 7 concludes.

2. A BRIEF REVIEW OF THE LITERATURE

The empirical literature on the effects of inequality on growth has increased enormously over the past two decades. The first set of studies (Alesina & Rodrik, 1994; Clarke, 1995; Perotti, 1996; Persson & Tabellini, 1994), dating from the mid 1990s, basically consists of reduced-form estimates of a growth regression in the form:

$$g = \alpha_0 + \sum_{m=1}^M \alpha_m Z_m + \delta INEQ + u, \quad (1)$$

where g is the average annual growth rate (usually measured as a dlog GDP *per capita*); $INEQ$ is a measure of income inequality (usually the Gini coefficient); Z_m is a set of other variables commonly used in standard growth regressions; and u is the usual error term. All studies use cross-section data from a relatively large number of countries and estimate

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