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Long-run relationship between inequality and growth in post-reform China: New evidence from dynamic panel model

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ABSTRACT

In this paper, we employ a panel of 27 Chinese provinces from 1984 to 2012 to estimate an autoregressive distributive lag model and find that there exists a robust positive long-run relationship between income inequality and growth in post-reform China. In addition, our estimation results indicate that physical capital investment, especially private capital investment, is a principal driver of the long-run growth in China, whereas the roles of human capital and public capital investment are largely ambiguous and insignificant. We also discuss the implications from comparing our estimation results with those obtained in another study using U.S. data.

1. Introduction

Casual observation reveals that the remarkable growth of Chinese economy since its reform began more than three decades ago has been accompanied by an almost equally remarkable rise in its income inequality. The economic reform, and the ensuing economic success, have transformed China from a relatively egalitarian society to a country with highly unequal distribution of income by world standards.[1] Such observation has attracted increasing interest as well as debate in both academic and policy arenas with regard to the extent to which the gains from Chinese growth have been shared by different segments of its population and whether the rapidly rising inequality may eventually jeopardize its growth potential in the future. Our current study aims at contributing to this debate.

The extant literature on studying the growth–inequality nexus is extensive and has yielded largely mixed results. Empirically, data heterogeneity/quality and different estimation techniques have been suggested as possible explanations for the diverse results in the

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[1] The nationwide income Gini coefficient has increased from about 0.30 in 1981 to 0.474 in 2012 based on the official statistics, although the figure was estimated to be much higher by some non-official sources. In comparison, the Gini coefficient of all countries monitored by the World Bank averaged 0.44 for 2010.

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existing literature.[2] For example, among the early studies based on cross-country data, Perotti (1996) found a negative relationship between income inequality and growth from cross-section regressions; whereas Forbes (2000) and Barro (2000) found a positive and no significant relationship between the two, respectively, from panel-data estimations. By using single-country panel data from the U.S., hence ameliorating some data and econometric problems that are usually associated with cross-country studies, Frank (2009) found a positive long-run relationship between inequality and growth among U.S. states.

Mirroring these mixed results, previous empirical studies on the growth–inequality relationship using Chinese data also varied in sample selection, estimation techniques, and results. For example, using a longitudinal household-level survey spanning 1987–2002, Benjamin, Brandt, and Giles (2011) found that initial income inequality negatively affects subsequent income growth for rural households in China. However, applying a panel with 28 provinces for the period from 1979 to 2004, the VAR estimation of Chen (2010) showed that in the short run a reduction in inequality reduces growth; whereas Wan, Lu, and Chen (2006) reported a nonlinear and negative relationship between growth and inequality by estimating the polynomial inverse lag model with a dataset consisting of 29 provinces over the period of 1987–2001. In a recent study, Chan, Zhou, and Pan (2014) employed VAR and system GMM statistical methods to analyze a panel data of 26 Chinese provinces from 1996 to 2012 and concluded that inequality tends to have a robust positive effect on growth.

In contrast to the previous studies using Chinese data, we focus on the long-run relationship between income inequality and growth in post-reform China and, similar to Frank (2009), estimate a dynamic panel model of growth with autoregressive distributive lag (ARDL) specification. Specifically, we construct a panel of 27 provinces of China over the period of 1984–2012, which is then used to estimate the error-correction form of the original ARDL specification by three alternative methods: the dynamic fixed-effect (DFE) estimation, the mean group (MG) estimation, and the pooled mean group (PMG) estimation. The adoption of these estimation methods is appropriate for applying to a heterogeneous panel such as ours, and all variables in our panel dataset are tested to be either stationary or cointegrated. Of particular interest, our estimation results indicate that Chinese provinces are converging toward a long-run relationship whereby inequality and growth are positively correlated. This result is robust with respect to different model specifications and different measures of income inequality and human capital. In addition, we also find that physical capital investment, especially private capital investment, plays a positive and significant role in the long-run growth in China, whereas the role played by human capital, as well as by public capital investment, is largely ambiguous and insignificant.

Our current research based on the largest developing economy of China also lends itself well to be compared with the study by Frank (2009) of the largest developed economy of the U.S. By comparing our estimate of the speed-of-adjustment parameter in the error-correction model with that obtained in Frank (2009), we find that Chinese provinces are converging faster toward the long-run growth equilibrium than the U.S. states. This result is consistent with the prediction of the "catch up" effect in the standard growth theory. Furthermore, consistent with the unified growth theory in Galor and Moav (2004), which argues that inequality tends to have more pronounced positive effects on growth in the early stage of industrialization when economic growth is mainly fueled by physical capital accumulation, we find that income inequality has a much larger effect on growth in China than does in the U.S.

Therefore, the contribution of the present paper is primarily twofold. First of all, differing from the previous empirical studies on similar topics in China, we adopt a new approach of estimating a dynamic panel model that focuses on the long-run relationship between inequality and growth, and the convergence property toward it, in post-reform China. The longer time span of our panel dataset, relative to the existing studies, also makes it appropriate to apply the dynamic–panel estimation methods. Second, by comparing our results with that obtained in Frank (2009), it sheds light on whether and how the growth–inequality relationship may vary across different stages of economic development. As such, our current study can offer a new and useful perspective for the related policy debate and formulation in China.

The remainder of this paper is organized as follows. Section 2 describes the variables and dataset used in our study. We then present our main empirical model and estimation results in Section 3. We also conduct additional estimations as robustness tests in Section 4. Finally, Section 5 concludes.

2. The data and variables

For our empirical estimation, we construct a panel of 27 provinces over the period of 1984–2012 in China from the following sources: (i) China Statistical Yearbook (1983–2013); (ii) Statistical Yearbook of Individual Provinces (1983–2013); (iii) Tabulation on the 1990 Population Census of the People's Republic of China; and (iv) China Compendium of Statistics 1949–2008.[3]

The key variables used in our study are as follows. The dependent variable is the growth rate of per-capita output (*gr*), where the output data series is deflated by the provincial GDP deflator. Due to the lack of complete and detailed income distribution data for calculating the provincial-level Gini index, and because the income disparity between urban and rural areas represents the main source of regional inequality and contributes to the largest share of income inequality in China (see, for example, Chen & Fleisher, 1996, Zhang & Kanbur, 2005, and Zhou & Qin, 2012), we use per-capita urban–rural income ratio (*urir*) as our primary measure for income inequality.[4] Indeed, as depicted in Fig. 1, the average urban–rural income ratio across provinces is highly correlated with the national Gini index over our sample period (with a correlation coefficient of 0.9887). In addition, we also use the following four alternative

[2] The theoretical literature on this issue is also, by and large, inconclusive (see, for example, Persson and Tabellini, 1994; Galor, 2000; and Galor and Moav, 2004).

[3] In our dataset, Hainan and Chongqing are merged with Guangdong and Sichuan, respectively, for the purpose of data continuity and consistency; while Tibet and Xinjiang are dropped from the sample due to lack of complete and comparable data for our entire sample period.

[4] The urban–rural income ratio has been commonly used as the measure of inequality in studies on Chinese economy, for example, as in Wei and Wu (2001) and Wan et al. (2006).