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Rise or Fall in Inequality? The Dynamics of Inequality Measures

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In recent years there has been a rise in the number of studies that study long term trends in inequality (Sala-i-Martin 2005, Durlauf et al. 2009). Such studies typically use a battery of a small number of measures, such as the Gini measure or other relative measures as a measure of inequality. Despite the wide array of inequality measures available (see Atkinson and Brandolini 2004), the social science literature still primarily uses the Gini, which measures income inequality relative to average income/GDP. Researchers are typically limited to the use only Gini estimates, (Deninger and Squire (1999) and the WIDER (UNU) (2010), or recently the WID (2018) datasets which has some top income estimates. In this paper I highlight that for time dependent analyses (for example, using panel regression approaches) there are a large number of inequality measures, which includes the Gini, that may not suited at all. The problem with a large number of relative inequality measures in particular for time dependent analyses lies in that inequality is measured relative to average (income). This implies that time trends of these inequality measures are likely to follow similar trends as that of the underlying income or GDP process which is used to generate them. GDPs/income are well established in the macroeconomic literature to be highly trended, and this is likely to be passed on to the relative inequality measure. The practice of using only relative inequality measures to gauge inequality has also been criticised by some recent studies (see Atkinson and Brandolini 2004, Bosmans et al. 2014), although they do not consider specific concerns about using time trends of relative and absolute inequality measures. To illustrate this problem I first put together a dataset of 18 (relative, absolute, and intermediate) inequality measures for 34 countries for 100 years using mortality (by age) distribution data (from [www.mortality.org](http://www.mortality.org)) as a proxy for income (the demographic literature identifies a strong association between the distribution of mortality and income distributions). I then model the time series properties of these 18 inequality measures for 34 countries as a fractionally integrated process and find that there are more countries that have mean-reverting and stationary absolute measures than relative measures. Time dependent analyses, such as panel regression analyses require the regressors and regressand to be stationary. This suggests that there are a number of inequality measures that present themselves to be more appropriate for time dependent studies compared with others. The popular Gini measure, in particular, does not perform well when tested for these properties, also established in Bandyopadhyay (2018). To investigate this finding further, I thereafter implement a panel regression application, where I estimate the popular inequality and growth relationship using

standard GMM panel regression methods, with all 18 measures. I find that the models that use measures identified earlier to be mean-reverting or stationary reveal a more stable non-relationship between inequality and growth, but not as much the case for relative measures. I further investigate the time dependent properties of these inequality measures by undertaking a VAR approach and estimate impulse response functions to observe the effect of a shock in GDP to the inequality measures. I find that for a selective few relative measures and the absolute measures, the effect of the shock dissipates and returns to its normal trend about 10 years earlier than that for relative measures. In other words, most of the relative measures (barring a few) carry with them the effect of a shock longer than absolute measures. I check further whether there is volatility in the temporal distribution of the inequality measures, which reveal that while all inequality measures have temporal volatility clustering, however, it is striking that the location of the volatility clustering in the temporal distribution of the inequality measures suggests that those with volatility clustering around the mean value are also not meanreverting or stationary, and also slow to converge in the impulse response functions. With these four sets of empirical tests above, the paper identifies that there is a sub-set of inequality measures (i.e. absolute measures and some relative measures) which perform best and present themselves as ideal candidates for panel regression and other time dependent analyses. References: Atkinson, Anthony. B., and Andrea. Brandolini (2004). Global world inequality: absolute, relative or intermediate? mimeo. Bandyopadhyay, Sanghamitra (2019): Rise or fall in inequality? The dynamics of inequality measures. Mimeo Bandyopadhyay, Sanghamitra (2018): The Absolute Gini is a More Reliable Measure of Inequality for Time Dependent Analyses (compared with the Relative Gini) *Economics Letters*, 162, 135-139, 2018. <http://dx.doi.org/10.1016/j.econlet.2017.07.012> Bosmans, Kristoff., Koen. Decanq and Andre. Decoster (2014). The relativity of decreasing inequality between countries, *Economica*, 81, 276--292.