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Demography, Growth, and Global Income Inequality

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Summary. — Global income inequality has been declining for several decades. We argue that global income inequality will reach its lowest level around 2027 and then will rise again. This development is the result of both economic and demographic forces. By combining economic projections with demographic developments and by using GDP per worker instead of GDP per capita in projecting income levels we emphasize the role of demographics in income inequality. Especially in the long run (after 2030), differences in population growth and population structure between countries in different stages of development are shown to increase global income inequality.

Key words — income inequality, Gini coefficient, age distribution, population, world distribution of income, poverty

1. INTRODUCTION

The past trends in (global) income inequality are well documented. But what trends can be expected in the future? We develop several global growth scenario's in order to project changes in income inequality in the next four decades.

The first industrial revolution brought with it a period of at least a 100 years of increasing income inequality in the world (Bourguignon & Morrisson, 2002). After first stabilizing halfway through the 20th century, a trend of global inequality reduction has been set in after the 1960s, one which continues to this day (Sala-i-Martin, 2006). The demographic and economic growth forces underlying these developments are analyzed in Firebaugh and Goesling (2004). A natural question to ask is, what will happen in the coming decades? We argue that the answer combines developments in both Africa and Asia. We have seen unstable growth in Africa, which might actually have continued diverging away from OECD countries. Asia, in contrast, has been the driving force behind the recent income convergence. Many Asian countries, among which populous nations like China and India, are rapidly developing. They are simultaneously catching up with OECD countries and pulling away from other developing countries, resulting in two opposing forces that will shape the trend in global income inequality in the near future.

We develop several global growth scenario's up to 2050 in order to project global income inequality in the next 40 years. Economic growth, driven by productivity increases, naturally plays a large part in this process, but given the long time horizon, demographic developments do so as well. For example, the population of Africa is projected to double in the coming four decades. At the same time Asian countries profit from a beneficial age structure, as many advanced countries have over the past decades. These countries are now starting to struggle with aging populations and fertility rates below replacement levels. All these developments directly (through economic growth) or indirectly (through the share of working age population) impact on global inequality. These developments are the central theme in this paper, which is the first paper to include both future population growth and population dynamics (age structure) by using GDP per worker as the underlying variable for future growth projections. This combined projection allows us to differentiate between economic and demographic effects on income inequality.

Section 2 gives an overview of the main findings of previous research regarding growth, inequality, demography, the interplay between them. Section 3 describes the data and methodology. Section 4 presents the results on global income inequality. Section 5 introduces a number of alternative scenario's as a robustness check for our main findings. Section 6 discusses recent literature and data on changes in within-country income inequality. The final section summarizes the most important conclusions.

2. LITERATURE REVIEW

Many interactions exist between economic and demographic variables. Future income inequality will be shaped by economic growth differences between countries as well as differences in population growth and the relative size of the working age population in each country.

(a) *Inequality in the past*

The academic discussion on economic growth and income inequality has, for obvious reasons, mainly focussed on the past (Bourguignon & Morrisson, 2002; Brat, 1995; Jones, 1998; Milanovic & Yitzhaki, 2002; Park, 2001; Sala-i-Martin, 2006; Schultz, 1998). Rising global income inequality in the past two centuries has been the rule rather than the exception, driven by the strong and continuous growth of a small number of (OECD) countries after the industrial revolution. This resulted in a twin-peak world income distribution, characterized by a large number of people (countries) with a low income level and a smaller group of

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people (countries) with a high income level, and not much in between. Milanovic and Yitzhaki (2002) therefore conclude that the world as a whole did not have a middle class.

Firebaugh and Goesling (2004) distinguish between "equalizing" and "disequalizing" factors. From the 1970s onward equalizing factors proved stronger than disequalizing factors and a trend toward lower global inequality started. The authors discuss these factors for the final two decades of the twentieth century. Major equalizing factors were the faster-than-world-average income growth in (i) China and (ii) South Asia, combined with (iii) a slower-than-world-average population growth in the Western offshoots. Major disequalizing factors were (i) slower-than-world-average income growth in sub-Saharan Africa, combined with (ii) a faster-than-world-average population growth in that region, and (iii) faster-than-world-average income growth in the Western offshoots. Firebaugh (2003) provides a more comprehensive analysis of the forces discussed above in relationship to globalization. We discuss similar forces to explain the future reversal of the trend of declining global income inequality in Subsection 4(b).

Amsden (2001) provides an overview of the dynamics underlying newfound growth in developing countries and the different approaches taken by developing countries. She distinguishes between countries coined "independents" and "integrationists". The independents include China, India, Korea, and Taiwan, the integrationists include Argentina, Brazil, Chile, Mexico, and Turkey. The independents have chosen a growth strategy in which the build-up of *national* firms and R&D expenditures are central. Amsden refers to this as the "make" technology decision. The integrationists rely more heavily on foreign direct investment and technology transfers, the "buy" technology decision. The strategic choice has influenced the economies of the developing countries over the past 30 years and will likely remain relevant for between- as well as within-country inequality in the future.

When using a decomposable inequality measure, such as the Mean Log Deviation (MLD) or the Theil index, the global inequality decline from 1979 to 1996 can be shown to be caused by a decrease of between-country inequality despite a rise of within-country inequality (Sala-i-Martin, 2006). It is thus possible that the overall convergence is mainly caused by income growth in the high-income quintiles of poor countries, leaving the income of the poorest people virtually unchanged. Ravallion (2001) finds that for two household surveys in the 1980s and 1990s held in 47 developing countries an increase in average household income typically came with a decrease in poverty. However, in just over half the cases where average household income increased this coincided with an increase in within-country inequality. For those cases where inequality increased a lower median rate of poverty reduction (1.3% *versus* 9.6%) was observed.

Edward (2006) provides estimates detailing that about 46% of the increase in consumption during 1993–2001 benefitted the world's highest income decile. In China growth mainly benefitted the middleclass. About 25% of global growth can be attributed to China as a whole. As Edward notes (2006, p. 1677): "The poorest half of the world's population received less than one-tenth of the global growth of the 1990s." The poorest people have thus in general been able to benefit from the convergence trend resulting in a decline in absolute poverty numbers (Dollar, 2005). Nevertheless, the poorest benefit only to a limited extent and these benefits go predominantly to the poor people in China.

(b) *Similar research*

It is quite common to investigate future income growth trends. Large investment banks (Buiter & Rahbari, 2011; Hawksworth & Cookson, 2008; Wilson & Purushothaman, 2003), as well as research institutes (Dadush & Stancil, 2010; Fouré, Bénassy-Quéré, & Fantagné, 2010; Poncet, 2006) have presented growth predictions up to the year 2050. This literature is, however, silent on the possible implications for global income inequality. Understandably, results are not completely uniform. This is in part due to differences in focus and/or data and partly because the time frame extrapolates minor variations in assumptions. Nonetheless, there is a general consensus on which countries will grow fast over the next 40 years: Asian countries. Eight out of the top ten growers identified by Buiter and Rahbari (2011) are Asian countries. In Hawksworth and Cookson (2008) the only nonAsian countries among the top 10 are Nigeria and Egypt. Besides Asia, Dadush and Stancil (2010) also have high expectations for Latin America and some African countries: Ethiopia, Kenya, Nigeria, and Ghana.

With regard to inequality a natural question to pose is: what effect will growth differences have on future global inequality? Although the question was posed by Sala-i-Martin (2002, 2006) it was given only minor further attention in these papers and is only briefly modeled with some extreme assumptions (such as no growth during 1998–2050 for many African countries). The growth predictions mentioned above are also only marginally useful in such an exercise, as the models are data intensive such that many countries will have to be excluded. Furthermore, there is a bias in the countries chosen to evaluate, namely the likely winners. We return to this issue in Section 6.

A study analyzing future income inequality trends requires a different approach, namely one that allows for inclusion of virtually all countries of the world, as well as the possibility to evaluate several scenarios, thus acknowledging that a lot can happen in 40 years time. Quah (1993) tries to tackle a similar question using a probability model, which calculates the probability of a country moving to the next income threshold. It proves to be an elegant but rather abstract approach. Countries converge toward extremes (either rich or poor), but the mechanics behind this outcome remain difficult to grasp. Jones (1998) initially holds on to neoclassical theory and assumes convergence toward "predetermined" income levels but also includes a long-run probability model in extension of the work done by Quah. He concludes that there has been a tendency to move up in the income distribution, which is likely to continue due to developments in China and India. In retrospect, this has indeed been the case.

To the best of our knowledge there are only two other articles analyzing future poverty and global inequality. Hung and Kucinskas (2011) focus attention on the impact of China and India only for the period 1980–2005. The last part of the paper also provides a simple projection into the future (until 2030) by holding growth rates and population shares for all countries constant at the 1980–2005 level, combined with a scenario in which this also holds for China and India and another scenario in which the growth rate for these two countries is halved. Both scenario's focus attention on the role of China and India and depict an eventual increase in income inequality in the future once China or India's average income exceeds the world average.

A more sophisticated projection is made by Hillebrand (2008) who uses Bhalla's (2002) simple accounting procedure