

Examining the Role of International Migration in Global Population Projections

Guy J. Abel, Samir K.C. and Nikola Sander

Wittgenstein Centre for Demography and Global Human Capital, Vienna Institute of Demography of the Austrian Academy of Sciences & International Institute for Applied Systems Analysis (IIASA)

Summary:

Advances in projecting international migration have been hindered by a lack of adequate data. Consequently, international projection-making agencies commonly use simplistic assumptions of net-migration measures derived as residuals from demographic accounting. However, past net migration can be often volatile and are known to introduce inaccuracies when projecting populations (Rogers, 1990).

This paper presents sets of global population projections to 2060, focusing on two alternative assumptions of international migration. Assumptions on rates of other demographic factors, namely fertility and mortality, are held constant allowing an examination of the role of international migration in global population projections models.

In the first projection, we set up the future migration in each country to mirror that of the United Nations Population Division (UNPD). In the second projection, we use a first-of-a-kind set of estimated 5-year bilateral migration flows by sex developed from the flows from stock methodology of Abel (2013). The net migration of the estimates within these flow tables matches those of the UNPD. Estimated bilateral flow tables are further disaggregated using a parametric assumption for emigration age schedules, and then summed over rows and columns to obtain immigration and emigration rates by age and sex. These estimates are used as base data in a bi-regional projection model, where immigration and emigration rates are assumed to remain constant up to 2060.

Our results highlight differences in the future level of populations around the globe and numbers of migrant flows between the net migration projection model and the bi-regional projection model.

Results:

In Figure 1 where we plot five lines. The first two represent past data and future levels of net migration as estimated and assumed (respectively) by the United Nations Population Division for the World Population Prospects in 2010 and 2012. Data are taken from the *wpp2010* (Sevcikova & Gerland, 2013) and *wpp2012* (Sevcikova et al., 2013) R packages. As illustrated in the plot, past data in the 2012 edition go back further than 2010. In addition in some continents such as Africa, the past estimates of net migration given in the 2012 edition are markedly different from that of the 2010 edition.

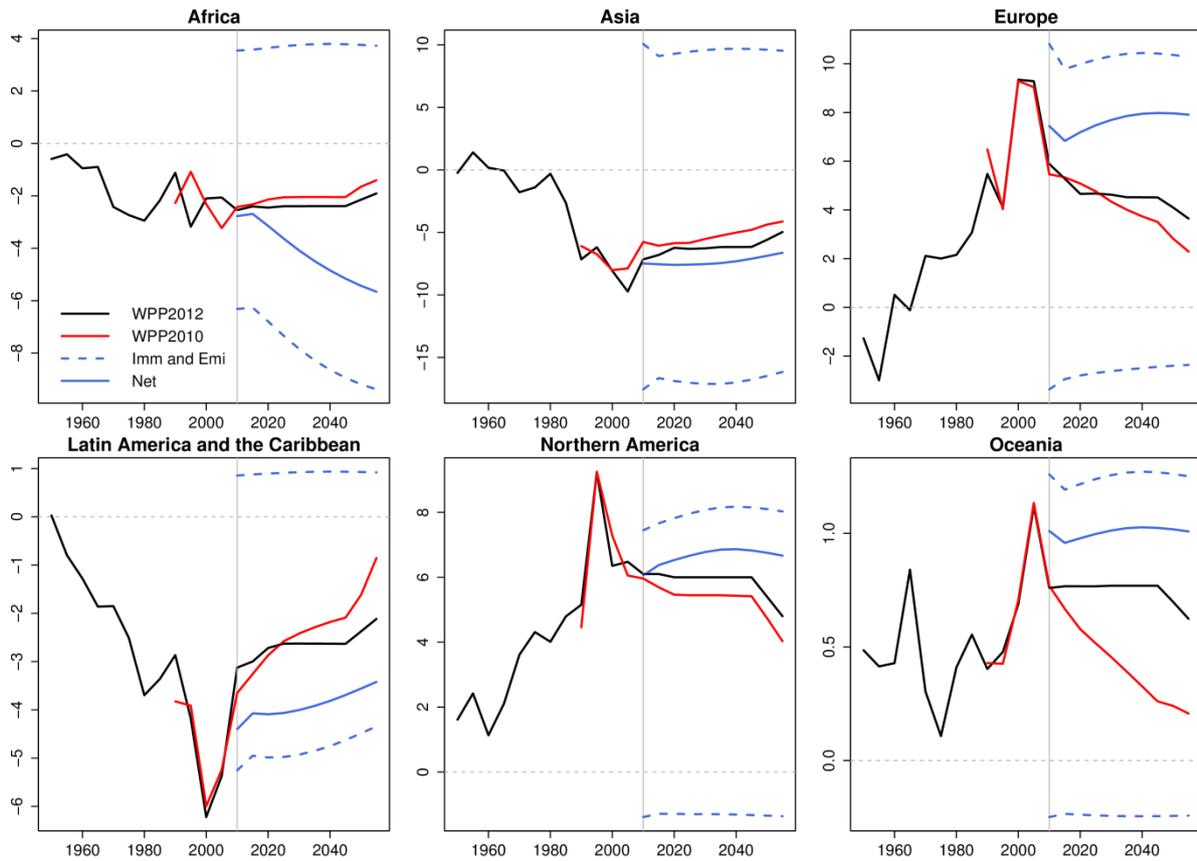


Figure 1: Projected Net Migration Levels by Continent (in Millions)

The two dotted blue lines represent the resulting future immigration (positive) and emigration (negative) levels that resulted from the assumed rates in the bi-regional projection model. The bi-regional model projects an increase in the number of emigrants from continents with young populations such as Africa. As the model is based on migration rates it adapts to changes in the population structure. Conversely, the projection model used by the United Nations assumes, in most countries, a constant net level in future projections despite expected changing age structures and population size. In Europe, North America and Oceania the bi-regional model projects a rise in net migration (shown in the solid blue line) as the immigration rate uses the rest of the world population as the population at risk. As this population at risk increases, so does the immigration to countries where we assumed a comparatively high constant rates of immigration. Note, differences between our implied net and the United Nations 2010 net migration in the base year of the projection are due to a small number of countries used in the projection model.

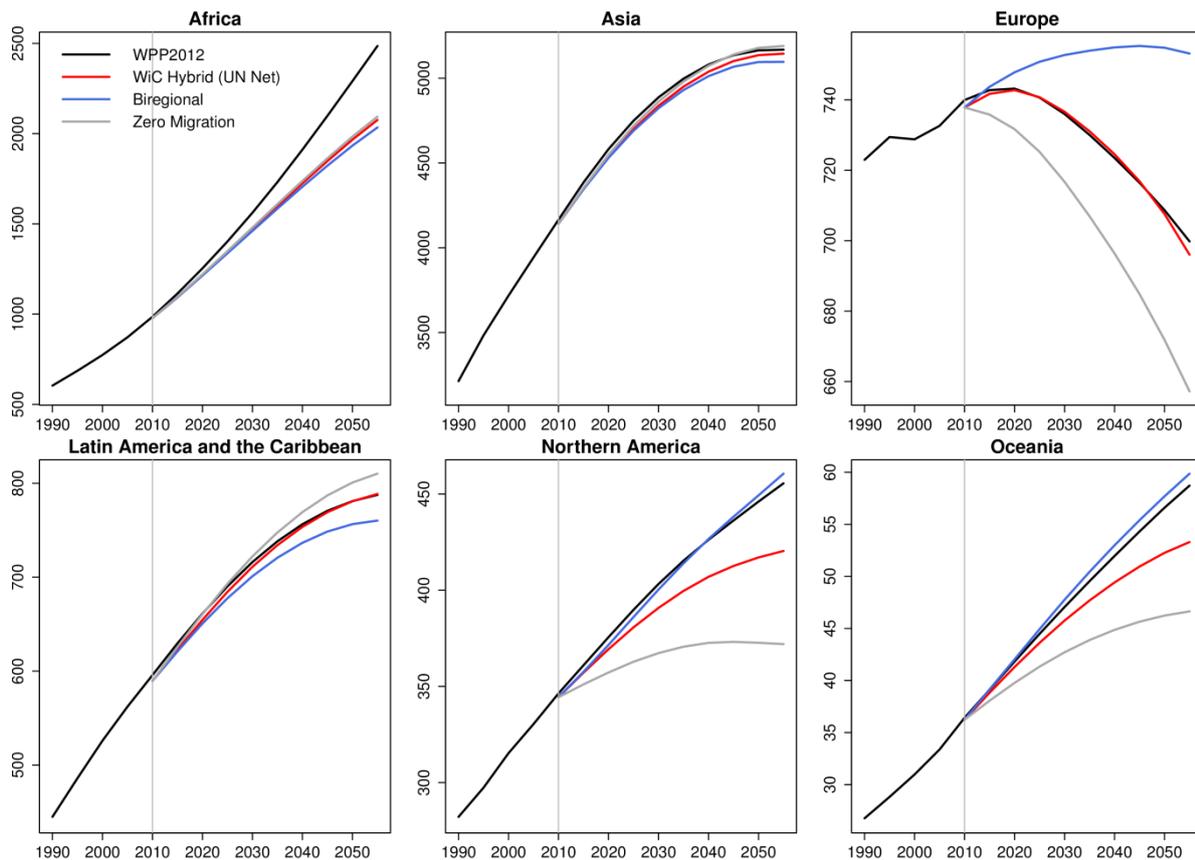


Figure 2: Projected Population by Continent (in Millions)

The bi-regional projection model provides substantially different future populations than in the net migration model. In Figure 2 we plot four lines representing various projected populations. The solid black lines are the median forecast of the 2012 World Population Prospects in each continent, which are shown purely for reference. The red line is a hybrid of the mid scenario in our Wittgenstein Centre (WiC) global population projections, where we drop the bi-regional specification and replace it with the same net migration levels as the United Nations (that underlie the black lines in Figure 1). As the level of net migration in this model is identical to that of the United Nations the difference between the red and black line represent differences solely from alternative fertility and mortality forecasts.

The solid blue is the original WiC bi-regional projection model. The differences between the red and blue represent the difference in the migration specification within global population projection models. For Europe, North America and Oceania the effect is drastic. The high levels of immigration from the rest of the world in the bi-regional model lead to a continuation of population growth. Under the hybrid model, with the United Nations net migration assumption, the future populations are expected to either fall (Europe) or slow in their increase (North America and Oceania). In the case of these latter two continents the bi-regional specification recovers the lower population, driven by alternative fertility and mortality assumptions, to levels close to those of the United Nations. Unsurprisingly, the impact of migration on the projected populations is largest in continents where fertility and mortality rates are at already stable low levels. This impact is shown by the difference in the principal projections from the populations resulting from the zero migration projection model.

References:

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