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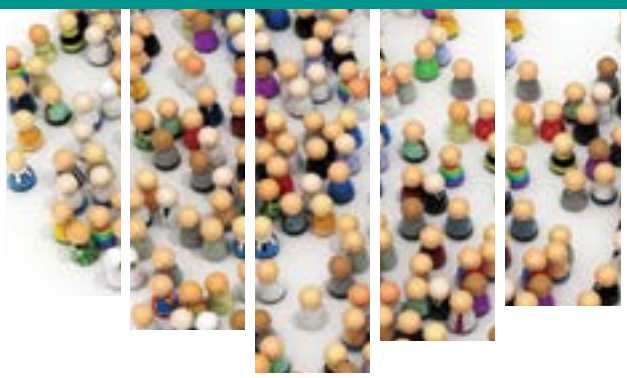

How to forecast international migration

Migration is a global phenomenon, and the United Kingdom (UK) is an important country of destination, as well as of origin, for many migrants. In recent years, migration has become an important topic in the UK policy debate. Having accurate knowledge of actual and predicted migration flows can be very useful for the planning and implementation of new policy tools and instruments, so what is the best way to forecast international migration?

Key Points

- Migration is very volatile and difficult to predict, but some types of migration flows are more stable, and therefore more predictable than others
- Models for predicting migration need to be tailored specifically for the type of migration flow being forecast, taking into account features of the underlying data
- When reporting migration forecasts, point estimates should be accompanied by a description of the uncertainty of the results
- Future work should focus on early warning systems, detecting the signs of changes in migration trends, and highlighting the potential policy impacts of migration processes

Introduction

There are many social, economic and political drivers which can impact migration flows, making forecasting migration an extremely difficult task. In particular, migration is very susceptible to shock events which are, by their very nature, hard to predict, such as economic cycles, military conflict and policy changes. Changes in migration flows can be subject to extreme short-term fluctuations, thereby making migration forecasts prone to very high levels of error.

In the past, migration forecasting has been attempted using a wide array of methods, with the central focus frequently on one or more of the following: extrapolation of past data, the opinion of experts in the field, and the inclusion of additional explanatory information, such as economic data and demographic characteristics. No method is considered to be universally superior, and the applicability of each method depends on the particular definition of migration under scrutiny, as well as the features of the data, such as how much data are available, how far into the future one is trying to forecast, and the stability of trends.

The inherent uncertainty about future migration flows is further compounded by problems with the quality of collected migration data upon which forecasts rely. Data sources can differ in the coverage of specific migrant groups, the accuracy of measurement and even in the definition of migration itself. Moreover, there exists no perfect migration theory that can be used for forecasting purposes. Even if credible theoretical explanations of past migration flows do exist, their principles tend to be difficult to extrapolate into the future.

The main source of data used to measure migration in the UK, the International Passenger Survey (IPS), has several weaknesses. Due to the sampling of respondents adopted in the survey, breaking the data down, for example to look in detail at migrants from/to specific countries of origin or destination, can give high margins of error. There can also be some bias in the numbers related to the way the data are collected, and the long-term IPS estimates are based on questions about the intended (rather than actual) length of stay in the UK or abroad.

The study

The aim of our research was to assess the degree of uncertainty in migration forecasting models – or how likely the different forecasts were to be correct. This was done by comparing the results of various models for different migration flows against actual trends observed in the past. The performance of different forecasting models were tested for two periods with visible migration 'shocks': the 2004 enlargement of the European Union, and the 2009 economic crisis. The forecasts have been assessed according to the magnitude of their errors, and how well they describe the predicted uncertainty in comparison with the real data.

Main findings

All the models examined in our work produced considerable uncertainty when tested against past data. For example, for migration from the new EU member states the more reliable models predicted that there was a 50 per cent chance that the average annual immigration between 2004 and 2013 would range from 100 to 200 thousand people; in reality, this proved to be just above 150,000.

Some models produced smaller errors and consequently were deemed to have performed better than others. Notably, the more successful forecasts were observed when predicting more stable migration flows such as the migration of UK nationals, which are less susceptible to unpredictable 'shocks' or policy changes.

In other situations, the applicability of various models was either limited, or completely inappropriate, with large errors and the actual observations remaining far outside the prediction intervals. In particular, no model was able to predict migration well if the underlying data series were short, or in the presence of 'shocks'. Still, even in such cases, some models performed better than others. When the migration process was expected to be unstable, models that did not assume stability of trends at least described the forecast uncertainty more accurately, and hence produced more honest results.

Policy implications

From the analysis, there is no particular model that can be considered as conclusively superior. Instead, it is recommended that any future analysis utilise a three-step approach to migration forecasting. Namely, future analysis should: (1) assess the nature of the migration flow being forecast, (2) evaluate the available data, and (3) design a bespoke forecasting model for the given situation. Instead of trying to do the impossible and design the 'best possible' migration forecasting method, further work in this area should focus on the ways of translating uncertain forecasts into policy advice and decisions.

It is imperative that all migration forecasts emphasise the uncertainty involved in the predictions. This is necessary to transparently acknowledge that migration cannot be forecasted without substantial error, whilst also providing an account for the possible size of these errors. Different ways of showing the range of errors are possible, by the means of probabilities for various ranges of possible outcomes.

Since the probability of a single forecast being correct is extremely low, it is vital that the uncertainty around migration forecasts is made explicit to decision-makers and the general public. Emphasising the uncertainty also allows

decision-makers to correctly represent the fact that migration can be affected by a wide range of events, including 'shocks', all of which need to be taken into account as, although they are quite unlikely, their potential impact on migratory flows could be large.

More research needs to be done on early warning systems designed to detect the signs of changes in migration trends in response to various indicators or policies. Their outcomes could be presented and analysed using the risk management tools – combining the potential policy impacts with uncertainty of the underlying processes – to facilitate making prudent and robust decisions. An example of a risk management matrix concerning different migration flows is provided in Table 1, with the red and yellow areas being those of particular policy focus. Another area for further exploration is the use of formal statistical decision analysis to support migration-related policies and decisions made under the conditions of uncertainty.

Table 1: A risk management matrix related to forecasts of various migration flows

Uncertainty (risk) / Impact	Low	Medium	High
Low		Long-term migration of UK nationals*	Short-term non-EU migration
Medium		Long-term migration of other EU nationals: old EU (Western Europe)* Long-term migration of non-EU nationals	Long-term migration of other EU nationals: Central & Eastern Europe* Short-term EU migration* Student migration
High		Visas issued, by type	Refugees and asylum seekers

Notes: Asterisks (*) denote flows, for which not too many policy controls exist. No migration flows are characterised by low uncertainty.

Source: Authors' own analysis

Further reading

The full version of the underlying report is available as: Disney, G., Wiśniowski, A., Forster, J.J, Smith, P.W.F., and Bijak, J. (2015) Evaluation of existing migration forecasting methods and models. Report for the Migration Advisory Committee. Southampton: University of Southampton. Accessible via: https://www.gov.uk/government/publications/evaluation-of-existing-migration-forecasting-methods-and-models (as of October 2015).

Disclaimer

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