

## Black swans and grey rhinos: Migration policy under uncertainty

Jakub Bijak and Mathias Czaika

### Uncertain migration and the crisis of governance

Migration processes are uncertain and volatile, eluding precise conceptualization, definition and measurement. Their reliance on complex driver environments, coupled with high-level human agency owing to the different actors involved in migration decisions – prospective migrants, intermediaries or policymakers – hampers both prediction and efficient policy responses (Castles, 2004; Anderson, 2017). This creates challenges related to managing migration both in the short and long terms. In this essay, we reflect on the uncertainty and complexity inherent in migration processes, and on the ways in which awareness of their presence could lead to better policy responses.

Migration uncertainty can be broadly categorized into *epistemic* (related to imperfect knowledge) and *aleatory* (linked to the intrinsic randomness of the world). Epistemic examples include the conceptualization, measurement, and description of migration and its drivers, along with human decisions, at least in aggregate. Aleatory uncertainty includes unpredictable shocks to migration and its complex driver environments, unforeseen advancements in data or analytical methods, and – last but not least – unpredictable aspects of human behaviour, their interactions, and human agency in the face of the unknown (Bijak and Czaika, 2020). While epistemic uncertainty can be reduced with new knowledge advances, aleatory features are unknowable and irreducible, and need to be managed accordingly.

In discussing uncertainty and how it can shape future migration flows and policy responses, it helps to rely on popular animal metaphors, which we use in this essay. First, there are swans: from the ubiquitous, predictable and manageable epistemic *white swans* (regular and orderly migration flows) which do not require special attention, to rare *black swans* (the aleatory, low-probability and high-impact events, the consequences of which can be severe) (Taleb, 2007). An example of the latter is an unforeseen large-scale natural disaster leading to mass displacement. Second, there are *grey rhinos* – events that are also very consequential in terms of their high impact, but are more predictable, yet “hiding in plain sight”, leading to neglect and inaction (Wucker, 2016).

While black swans are linked to the intrinsic failure to predict them, grey rhinos are related to the failure to act upon prediction. Sometimes the character of a process may change: a current example is asylum-related migration, which has moved from the initial surprise of a black swan to the grey rhino territory. Even though its drivers, exact timing and magnitude remain unpredictable, especially after the 2015 “asylum crisis” in Europe, we are now acutely aware that such events happen and have large consequences, and can envisage them happening in the future.

Most of what is often perceived as “migration crisis” is in fact a migration *governance* crisis. Every time “unwanted” immigration figures rise unexpectedly, governments and parts of host societies feel pressured: migration governance systems are seemingly losing control due to a perceived unpreparedness in managing and coping with a large-scale influx and the incorporation of new arrivals. These times of crisis are often due to deficiencies in migration governance systems, predominantly in the areas of prediction, prevention, protection and public engagement.

The frequent failure in predicting “migration humps” well in advance and within acceptable margins of error – or at least anticipating future migration shocks and trends with some accuracy – is largely caused by limited knowledge and predictive capacity for anticipating the early signs of changing migration driver configurations, as well as the unpredictability of black swan events. Enhancing predictive capacity with better theory, data and models is therefore essential to increase the preparedness level for alternative time horizons.

Smart migration governance prepares and is prepared for both foreseeable and unforeseeable migration situations and their societal impacts. Migration governance should not become a part of the problem by creating additional uncertainty through erratic or poorly designed policies that send false signals to would-be migrants – for instance, those that may trigger unwanted irregular migration. Migration, if well managed, benefits many stakeholders, but if mismanaged, it can also be harmful for migrants, host societies and migration governance systems alike. Thus, it is essential to prevent migration policy failure and unintended migration outcomes by designing policies based not only on traditional assumptions regarding migrants’ decision-making logic (including common sense or cost-benefit thinking), but also on new insights (e.g. from behavioural sciences regarding decision heuristics and “nudging”) (Czaika and Reinprecht, 2020; Sunstein, 2013).

Governance systems also often fail to protect both migrants and other groups affected by undesirable migration situations. Smart migration governance is based on a clearly designed actor network with clearly specified responsibilities and systematic and regular communication between actors, who respond in a swift and coordinated way to the early indicators of an upcoming undesirable migration situation. Lastly, smart governance requires state and non-state actors to engage effectively in public discourse by constructing transparent, informative, unbiased and evidence-based narratives on migration as a complex social reality.

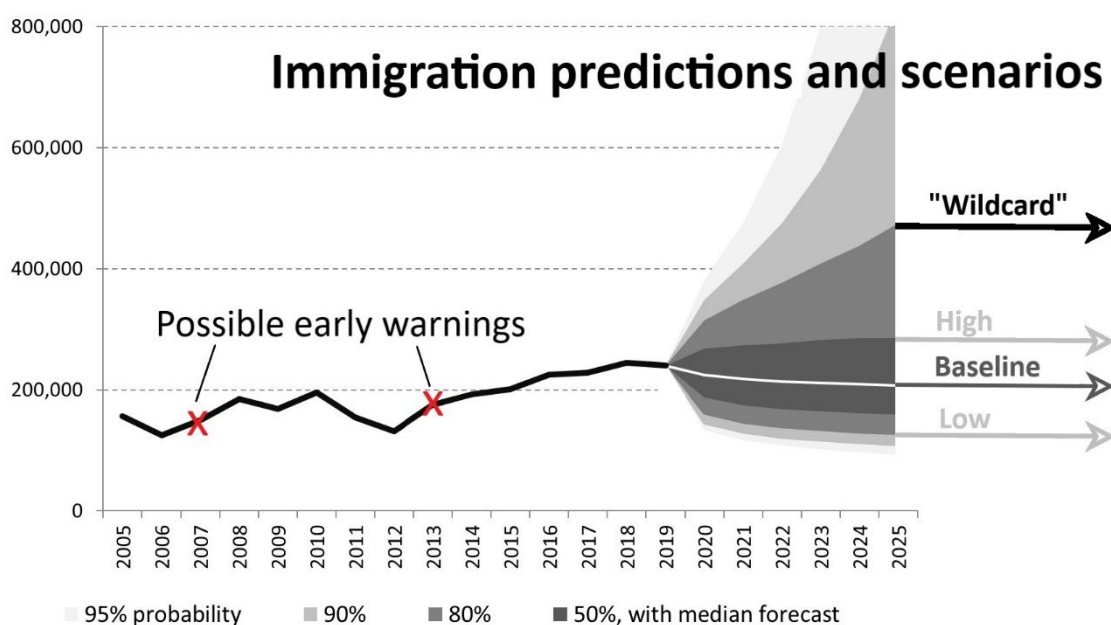
### **Illuminating the uncertainty and complexity**

Migration decisions are taken in the context of personal needs, livelihood challenges and opportunities, stress, urgency, and uncertainty, based on limited and incomplete information about migration prospects or alternative options. Thus, migration decisions are both situational and contextual – that is, the configuration of *complex driver environments* is very specific to the time and place in which migration aspirations are formed and decisions taken. More often there is no single reason or “root cause”, but rather a complex combination of economic, political, and social factors and other developments and events that may dynamically influence migration opportunities as well as the willingness *and* ability to migrate. The intertemporal accumulation of triggering factors leads to certain “tipping point” situations, where large-scale population movements are suddenly set in motion. For instance, many Syrians stayed in their hometowns years into the civil war and only fled to neighbouring countries once their economic basis of subsistence eroded – and was further degrading through environmental stress to the extent that staying was no longer a viable option.

Migration forecasting must deal with different types of the epistemic and aleatory uncertainty that are intrinsic to the dynamic, and sometimes erratic, development of complex driver environments. Any reliable analysis of future migration has to identify: (a) the *relevant* migration drivers; (b) the complex ways and extent to which those drivers intersect and interact; and (c) the intensity with which driver configurations impact the migration aspirations and abilities of would-be migrants.

Existing methods for acknowledging and dealing with migration uncertainty vary across a range of time horizons. The short-term early-warning systems, mid-range predictions (ideally probabilistic) and long-term scenarios offer a way to shed some light on the uncertainty (see Figure 1). The predictability of these approaches inevitably decreases with the time horizon. Despite migration not being predictable in a strict sense, different methods can offer at least some approximate insights into the possible futures. They also map closely on to the different levels of migration management, with early warnings potentially aiding operational responses (humanitarian relief, border operations) in the short run, forecasts supporting tactical and planning-related policies in the medium term, and scenarios helping with long-range strategic decisions. In all cases, the aim is to increase preparedness and shift the response from reactive to proactive.

**Figure 1. Examples of forward-looking approaches to aid migration governance decisions**

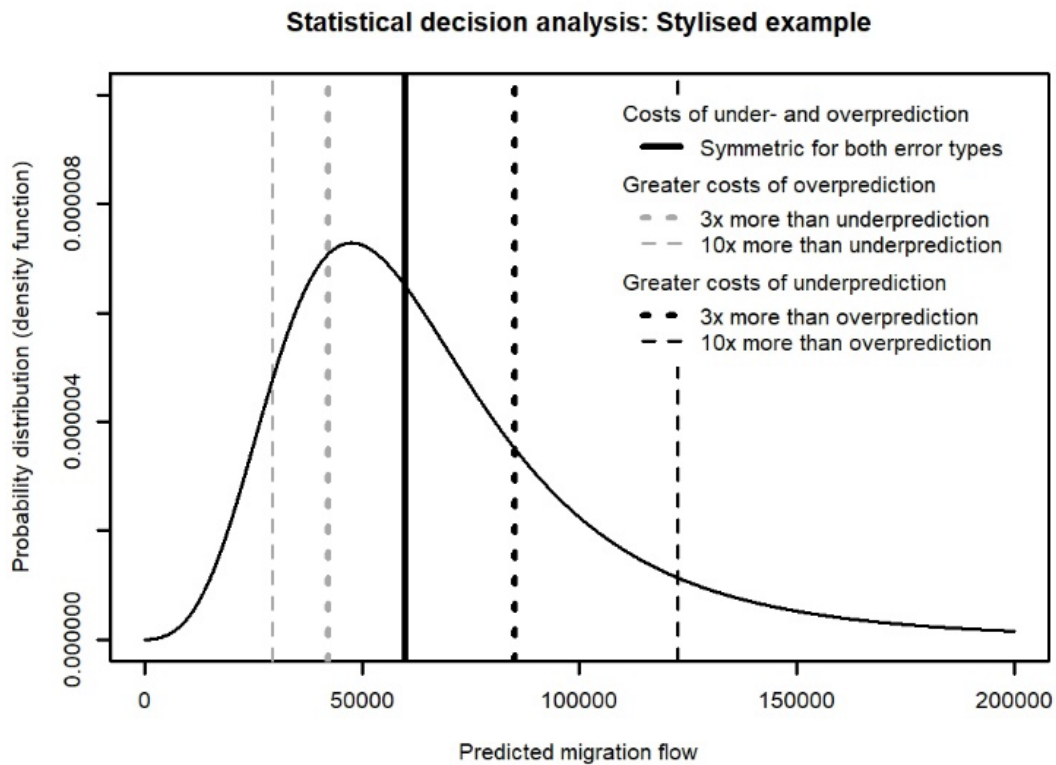


Source: Own elaboration, based on IOM / J. Bijak, 2016.

The probabilistic treatment of early warnings, predictions and scenarios additionally enables a formal decision analysis of user-specific responses, by allowing *loss (cost) functions* that describe the real-life implications of predictions and various migration outcomes. Figure 2 presents stylized examples, with decisions depending on the interplay of the costs of over- and underprediction. Notably, the same prediction can lead to different decisions in different contexts and for various users (Bijak, 2010). For black swan events, the probability and loss functions are difficult to approximate, but the decision analysis can help elucidate policy options in the face of migration-related grey rhinos.

We can further reduce the epistemic uncertainty by exploring the regularities and existing stable features of migration processes, such as age or spatial structures, remittance flows, or migrant stocks. Another method with great potential is using more and different data sources creatively, in a joined-up way, subject to ethical and privacy constraints. This includes combining traditional and “new” data, such as digital traces, especially important in the context of early warnings (Spyratos et al., 2018). Training in prediction and honing “good judgement” skills among forecasters, while retaining realism about the limitations of predictions, is also a promising option (Tetlock and Gardner, 2015).

Figure 2. Stylized decision analysis based on probabilistic migration prediction



Note: Decisions depend on whether overprediction is more costly than underprediction – and by how much (grey dashed and dotted lines) – less costly (black dotted and dashed lines), or as costly (thick black line).

Source: Own elaboration, based on Bijak, 2010.

### Taming the beasts: Towards better policies

Still, predictions are not the end, but rather the means to aid policy decisions. Ultimately, these decisions are down to the political and implied public choice among available options, weighing their costs, risks and feasibility. These choices, in turn, reflect the underpinning social values, such as in the “freedom versus security” dilemma. As quipped by the former British Prime Minister Margaret Thatcher, “advisers advise and ministers decide”, and this adage is relevant just as well for predictions. Still, formal methods for taming the uncertainty can help improve the openness and transparency of decision-making by illuminating the trade-offs involved. This process needs to start from defining the problem and the policy question, which will then guide the choice of analytical tools and delineate the space of possible responses, alongside their limitations.

So which options work for black swans and grey rhinos, and how do we tame these animals? Being able to tell them apart is crucial: here, predictability is key, and the difference between aleatory and epistemic uncertainty becomes paramount. For unpredictable, aleatory black swans, the main responses entail preparedness and building resilience, so that the systems have enough spare capacity to react to unpredictable events, whatever they are. These solutions rely on the availability of dedicated resources and expertise, along with the political will to commit these resources in case they are needed.

Similar precautions hold for grey rhinos, with the caveat that their nature brings about an additional challenge: constant reminders of their presence when they do not happen may sound like false alarms and lead to complacency. Still, by acknowledging that such events occur, even if infrequently, a robust policy design can include built-in mechanisms to help learn from experience (Wucker, 2016). With many tools available for managing crisis and disaster response (e.g. Twigg, 2004), there are ample ideas to rely on – from creating separate crisis funds (“saving for a rainy day”), building up financial and operational capacity reserves, to redistributing resources across affected communities, or relying on market-based insurance and reinsurance mechanisms.

All these solutions do not have to be exclusively related to rapidly changing migration processes, such as forced displacement and asylum. They could also be used for relieving other localized and short-term pressures on public infrastructure that other types of migration may generate. Monitoring of crises at the European Union level already exists, including warning signals of potential displacement (European Commission, 2020), and its remit could be expanded to cover a varied range of high-impact flows.

For grey rhinos, it is crucial to acknowledge that any predictions are at best approximations of future migration – and to act prudently in light of this. This requires resources and – fundamentally – the political will to act now to avoid problems in the future. This brings us to one key obstacle: intertemporal trade-offs in policy design, with short-term political decision horizons, driven by electoral cycles, are usually not long enough to design robust solutions, which require investing resources now to mitigate uncertain crises and high-impact events later.

## **Conclusion**

Our ability to predict future migration remains limited. Despite an increasing sophistication of analytical capabilities – due to better data, models and concepts – the acceleration, proliferation and diversification of social, economic, technological, and political transformations and “tipping point” events increase migration-related uncertainty, particularly in the long term. So, what can we do?

Searching for the root causes of migration to predict future flows does not help. Rather, we should understand the functioning of broad driver environments, and the conjoint effects of multiple interacting factors and forces that impact the aspirations and abilities of would-be migrants. We need to enhance our understanding of the ways by which sudden or gradual shocks may cause uncontrolled feedback, cascading effects, extreme events and unanticipated side effects regarding migration outcomes, which would increase the accuracy and reliability of migration flow estimates and forecasts.

A smart migration governance system that involves a network of policymakers, migration experts and other stakeholders reflects collectively and acts in a coordinated and coherent way to prepare for, adapt to, mitigate or prevent the manifestations of migration-related uncertainty. Such a governance system will not only be able to anticipate and act upon grey rhino shocks, but also be resilient and flexible enough to manage unforeseeable black swan events that have the potential to destabilize entire societal and governance systems. Yet, ultimately, a smart governance system must also prepare to be unprepared.

*Work funded by the European Union's Horizon 2020 research and innovation programme; grant No. 870299 QuantMig: Quantifying Migration Scenarios for Better Policy. This essay reflects the authors' views, and the Research Executive Agency of the European Commission is not responsible for any use that may be made of the information it contains.*

## References

- Anderson, B.  
2017 Towards a new politics of migration? *Ethnic and Racial Studies*, 40(9):1527–1537.
- Bijak, J.  
2010 *Forecasting International Migration in Europe: A Bayesian View*. The Springer Series on Demographic Methods and Population Analysis, 24. Springer, Dordrecht.
- Bijak, J. and M. Czaika  
2020 Assessing uncertain migration futures: A typology of the unknown. QuantMig deliverable D1.1. University of Southampton & Danube University Krems. Available at [www.quantmig.eu/res/files/QuantMig%20D1.1%20Uncertain%20Migration%20Futures%20V1.1%2030Jun2020.pdf](http://www.quantmig.eu/res/files/QuantMig%20D1.1%20Uncertain%20Migration%20Futures%20V1.1%2030Jun2020.pdf).
- Castles, S.  
2004 Why migration policies fail. *Ethnic and Racial Studies*, 27(2):205–227.
- Czaika, M. and C. Reinprecht  
2020 Drivers of migration: A synthesis of knowledge. IMI working paper No. 163.
- European Commission  
2020 *INFORM Report 2020: Shared evidence for managing crises and disasters*. Available at [drmkc.jrc.ec.europa.eu/inform-index](http://drmkc.jrc.ec.europa.eu/inform-index).
- International Organization for Migration (IOM) / Bijak, J.  
2016 Migration forecasting: Beyond the limits of uncertainty. *Global Migration Data Analysis Centre Data Briefing Series*, 6. Available at [gmdac.iom.int/gmdac-data-briefing-migration-forecasting-beyond-limits-uncertainty](http://gmdac.iom.int/gmdac-data-briefing-migration-forecasting-beyond-limits-uncertainty).
- Spyratos, S., M. Vespe, F. Natale, I. Weber, E. Zagheni and M. Rango  
2018 *Migration Data Using Social Media: A European Perspective*. JRC Technical Reports. Publications Office of the European Union, Luxembourg. Available at [publications.jrc.ec.europa.eu/repository/bitstream/JRC112310/facebook\\_study\\_v3.pdf](http://publications.jrc.ec.europa.eu/repository/bitstream/JRC112310/facebook_study_v3.pdf).
- Sunstein, C.R.  
2013 *Simpler: The Future of Government*. Simon & Schuster, New York.
- Taleb, N.N.  
2007 *The Black Swan: The Impact of the Highly Improbable*. Random House, New York.
- Tetlock, P.E. and D. Gardner  
2015 *Superforecasting: The Art and Science of Prediction*. Crown Publishers, New York.
- Twigg, J.  
2004 *Disaster Risk Reduction: Mitigation and Preparedness in Development and Emergency Programming*. Humanitarian Practice Network, London.
- Wucker, M.  
2016 *The Gray Rhino: How to Recognize and Act on the Obvious Dangers We Ignore*. St. Martin's Press, New York.