Extended abstract

Novels approaches based on sequences analysis and graphs for grasping complexity of migrations

Introduction

Research objectives of most migration studies are generally to understand the drivers of migration (economic, environmental, social, political factors, etc.) and sometimes the choice of destination (Davies and Greenwood, 2001; Gordon and Vickerman, 1982; Knapp and White, 2001). The migrations studied are thus generally extracted and isolated from the rest of the migration pathway (MP), defined here as the succession of all the migrations carried out in the course of a lifetime or over a period of life. Isolating a migration from the MP misses the complexity of a migratory journey that an individual may make throughout his/her life and. It is equivalent to considering that previous migrations do not influence subsequent migrations. Migration studies are also very dependent on the data collected. Data collection follows similar protocols, which inevitably leads to redundancy in the type of data processed. We make the double hypothesis that part of the complexity of the migration phenomenon can be revealed by focusing on the study of the MP and that the MP is not predetermined because each migration opens or closes a horizon of opportunities and changes that are difficult to predict.

Migration is no longer reduced to a simple form (rural exodus or international south-north migration, for example) but takes more diverse forms notably circular and temporary migration (Pellerin, 2011). MPs include e.g. loops, back home, circulation between places sometimes connected by migrant associations, etc. While these different forms of mobility are known, the temporal interactions between them (in a sequence) are still poorly described. Few studies have also attempted to compare MPs in order to identify significant differences according to gender, age, generation or level of education (Bernard and Vidal, 2020; Kleinepier et al., 2015; Vidal and Lutz, 2018).

The aim of this paper is ***to describe and understand individuals' MPs and to highlight the effect of individuals' migrations on the following ones throughout a migrant's life***.
Research question include: what are the typical MPs during a life, or specifically before or after a certain move (e.g. international, toward big cities, toward agricultural front)? How to explain them through socioeconomic information collected at the individual and household levels? How spatio-temporal scale of analysis impact the knowledge generated?

We sought to understand both the migratory causes and consequences of an event (marriage, end of studies, etc.) or a place (residence abroad or in Manila) through the use of MPs. The duration of certain residence (in rural urban areas, abroad, in one's place of origin), or even the definition of "obligatory" stops, is still poorly known today. Is a stop in a rural area equivalent to a stop in an urban area? Is there a leverage effect of going to a big city? Is the urban exodus visible? Is it automatically a return to one's place of origin or a new departure to a rural place? Does a move to a very large city (Manila or Cebu) have the same impact on the migration sequence as a move to a smaller city?

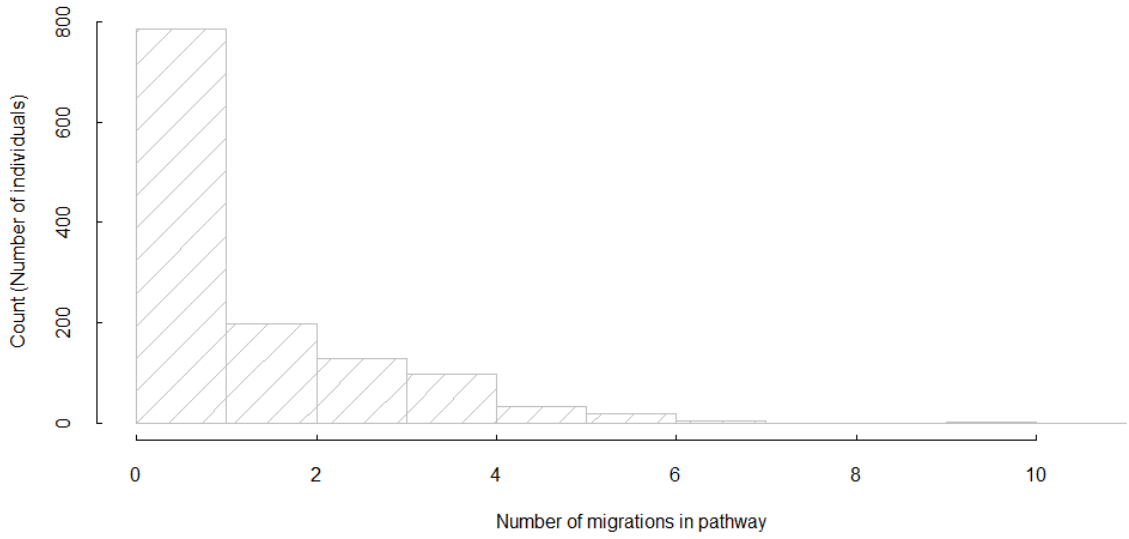
Study area

The Philippines is the country chosen for this study. For migration scholars, this country is well-known for international migration: about 10 percent of the population are working abroad (Carlos, 2002). For skilled and low-skilled Filipinos, international migration is one of the best strategies for a better life and most of the time, temporary work overseas is the option chosen. The international destination varies with the gender and the purpose. For female, the main occupation is domestic helper often in the South East Asian small states, like Singapore or Hong Kong. The occupations of the male are more diverse, e.g., usually seamen or low skill labor. Internal migrations between the numerous islands composing the country have also been studied, with a focus on migration toward forest frontier area (Mialhe et al., 2014).

Our fieldwork was conducted in the municipality of Batuan, located in the central part of the island of Bohol. It is a rural land-locked municipality where irrigated rice cultivation predominates in the lowlands and where food crops (e.g. corn, taro) are grown next to coconut plantations on the slopes. Biophysical and historical context generated long term crisis in agriculture sector. It is known as an emigration place. Migration was also a strategy during drought induced by El Niño and warfare moments.

Data and Method

The data collection was carried out in 2012 in order to better understand migration trajectories. Surveys were conducted in five barangays of the municipality in which 20% of the total households were sampled. A total of 191 household heads were interviewed based on a survey questionnaire and on the construction of graphs that represented the migration pathways (MP) of all household members over 15 years old (the threshold age for considering the person independent). Interviews include a period of time during which we built graphs with the respondent that represent his/her lifetime MPs and the MPs of the relative living in the household. In total, 1272 MPs were obtained (from 642 men, 626 women) in the form of graphs; tracing the succession of living places (where they resided for at least six consecutive months) and the main reasons for migration. These MPs, i.e. composed of a series of migratory sequences, which is chosen as the unit of analysis. The data from the questionnaire were used to describe the different forms of capital (physical, human, natural, social, financial) held by each person and their household at the time of the survey. Among the 1272 individuals of our database, 608 people have never migrated and 664 people have migrated at least once.



In order to meet our double objective, we use analytical approaches that, to our knowledge, have been little used in the field of migration: (i) sequence analysis on the one hand and (ii) graph analysis on the other hand. For both, we used R packages to perform the analysis (e.g., Traminer and Igraph). In the literature about human migration, the literature that uses sequence analysis is very limited. One exception is the study about everyday mobility in relation to climate (Brum-Bastos et al., 2018). Sequence analysis in social science is mostly concerned on socio-professional trajectory (Robette, 2014). The literature on migration that uses graphs is also very limited; and when it does so it is at a very large scale (Davis et al., 2013). Attempts have been made to combine sequence analysis and graph analysis, but again, outside the field of migration (Bison, 2014).

Expected results

Sequence analysis relates either to events or to states. In the first case, the first results offer a new perspective by listing and ordering the successions of events (i.e. migrations in our case), which precede or follow a target migration. This analysis, for example, led to a better understanding of the migrations that preceded the international target migration. In the vast majority of cases, this target migration was preceded by a stay in the capital, Manila. Traminer package thus makes it possible to list the MPs by frequency by considering only the succession of places of stay. Cross-referencing with the socioeconomic characteristics of individuals will reveal the differences and similarities between people who have carried out the same MP.

The sequence analysis of states considers the length of stay in each location. The grouping of individuals was produced on the basis of the dissimilarity of MPs by considering as a unit of time, one year or one semester. Analysis sought to cluster MPs to group together individuals who had close MPs. Cross-referencing with (i) socioeconomic data at the level of each individual made it possible to know what are the characteristics of each group; (ii) socioeconomic data at household level made it possible to unveil the roles played by households on MPs.

The graph analyzes, on the other hand, revealed recurring patterns using several typical graph metrics (e.g., connectivity, centrality, length) that we sought to interpret in light of the object of study. One of the particularly interesting results is the diversity of knowledge generated according to the chosen time and space scales. We have indeed combined several levels of these scales (periods in the life of individuals versus historical periods, topological space versus geographic space), which produced a diversity of graphs whose interpretations have revealed different aspects of migrations.

Conclusions

Through original first-hand data collection in the Philippines, this paper aims to capture the complexity of migration and its cumulative effects over a lifetime. The innovative analysis of migration paths based on sequence analysis and graphical analysis promises to provide new insights into mobility in this country. Nevertheless, the theoretical and methodological lessons should be transposed to other countries.

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