Constructing Big Data for Japanese Historical Population: Challenges and Opportunities

Satomi Kurosu (Reitaku University) and Hao Dong (Princeton University) (in collaboration with M.Takahashi and A.Nagaoka)



Mathematical and geographical modelling for environmental humanities Kyoto, October 31, 2016



"It started 50 some years ago...**BDS** was an innovation".....*Akira Hayami (1929-),* founder of historical demography in Japan

Outline:

- 1. A Long Way of Digitization: From Texts to Bits
- 2. Old and New Approaches of Data Base Construction
- 3. A New Framework of Analysis: EAP and Marriage
- 4. Challenges and Opportunities
 ➢ Application of EAP model to other population
 ➢ Geographical mobility



July 2015 in Mita, Tokyo

1.Long way to analysis

1.1 Original Sources

Shumon-aratame-cho (SAC) Investigation of religious faith 1639-1871--- Christianity was considered dangerous and banned

• Ninbetsu-aratame-cho (NAC):

Population registration/survey---Similar to SAC without religious inquiry

♦ Other

Kako-cho (Temple registers)

Kainin-kakiage-cho (Pregnancy registers)

Village/regional documents ---numerous!



A scene from religious investigation, *shumon-aratame* (from Siebold, *Japan*)

1.2 Example of Population Registers (NAC)



出典: 『江戸時代の東北農村 二本松藩仁井田村』 (成松佐恵子 1992)



notations

1.4 Data entry using *Shumon-data-entry program*

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2 Old and New Approaches of Data Base Construction: From Village-Based to Population Based Analysis



Since **1995**: Relational Database (DB2), discrete "small data" for separate villages

1. EAP (MIT Press Series) approach: Construction of variables for EAP models DB2(SQL)→CSV→Stata

2. Alternative approach: $QUERY \rightarrow EXCEL$

Since **2013**: Flat Database (Stata), pooled "big data" for all villages and regions

Level1 Data Combine all raw data, checking and cleaning, construction of basic information (e.g. sex, age, year of birth)

Level2 Data Construction of basic variables (e.g. relationship to household head, marital status, timing of vital events)

Level3 Data Further construction of variables for analysis

Village based analysis

> Population based analysis

Separate CSV Datasheets, Relational SQL Database, and Flat STATA Dataset

- Separate CSV Datasheets
 - Each file contains information of a specific aspect and/or for analytical units of a specific level
 - For example, each village in Shumon data include separate csv datasheets for household time-variant information, individual time-variant information, vital events, etc., respectively.
- Relational SQL Database
 - A database includes all separate datasheets linked by common priory identifiers
 - Low efficiency and high demand in data management (e.g. variable construction, data restrictions, etc.).
 - Data management and analysis are separate
- Flat STATA Dataset
 - A unified data file integrates complete information contained by separate datasheets
 - Straightforward and relatively efficient for data management
 - Data management and analysis are in one flow.

Steps of database construction using DB2 & STATA

1) Coding (categorizing) events using Excel

- 2) Importing files (containing time-variant & time-constant info. at individual, household & community levels, and also events) to DB2
- Construction of 'tables' using DB2 (with commands written in SQL), that contain variables to measure risks of events, individual & household characteristics, and kinship relationships
- 4) Exporting 'tables' to STATA
- 5) Merging tables using STATA, and construction of additional variables with STATA

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Proportion of observations linked to subsequent registers 100 Thousand Lives in 200 Years



Total person-year observations for 52 villages, 1670-1870



Average size of household by current prefecture: 1670-1870



Data Collection at Population and Family History Project, Reitaku U.



3.1 A New Framework of Analysis: EAP and Marriage

Eurasian Population and Family History Project (EAP):

- A study of marriage in preindustrial Europe and Asia that goes beyond the Malthusian East–West dichotomy to find variation within regions and commonality across regions.
- Comparable individual panel data for complete rural communities from population registers in Sweden, Belgium, Italy, Japan and China 1700-1900 (1,000,000 person years or observations)



\geq %Never-married \rightarrow East (early and universal) and the West (late and selective)

Similarity in Difference

Manlage in Europe and Asla. 1700–1900



Similarity in Difference: Marriage in Europe and Asia, 1700-1900 Lundh, Kurosu, et al (The MIT Press 2014)

3.2 EAP and Marriage : Similarities

The EAP applied identical or nearly identical models relating marriage outcomes to characteristics of the community, the household and the individual

- Found more similarities: importance of *power* (location within family and other status hierarchies) and *property* (location within SES/wealth hierarchies) in structuring inequality
 - Strong positive association between SES and timing of marriage in all male populations
 - household relationship was important in Asian context; however, parental and other family contextual influences were apparent in Europe as well--e.g. sibling effect in first marriage, child effect in remarriage
- Differences within Europe and within Asia are as important as differences between the two regions

3.3 EAP and Japan: differences

A) In Europe, marriage was closely linked to reproduction, in Asia it was a promise of future reproduction

>What is marriage? Not just for reproduction and personal preference/taste but for household labor, to secure family continuity and old age care; important for survival

- B) In Asia, marriage was not a formation of a new household: new member was incorporated into his/her parental household
- C) In Japan, stem family system was ideal and practiced---only one from one generation stays and the rest leaves → two types of marriage Virilocal (wife marry into live with husband's family) vs. Uxorilocal (husband marry into live with wife's family)

>SES important not only for men but also for inheriting women (i.e. uxorilocal marriage for women)

>presence of sibling was important for marriage: However, sib size mattered in Europe but order mattered in Asia (being first vs. rest \rightarrow difference in life course patterns)

D) In Japan, remarriage was the most frequent→ but just like Europe, higher SES was associated with lower likelihood of remarriage (opposite in China)

4. Challenges and Opportunities

- Time to accumulate more detailed comparisons: Apply the EAP approach/methods to new data from other villages and towns
 - 1. Regional variations (Northeast, Central, Southwest) to be examined with micro data
 - 2. Non-rural setting (e.g. Koriyama town) or non-agricultural setting (e.g. fishing vil.)
- Comparison within Asia and/or East-Asia (e.g. joint vs. stem family)
- Linking past to present: Implication to contemporary demography
- Link to contextual information (climate change, famine, policy...)
- Relationship among demographic factors (mortality, reproduction, marriage, remarriage, migration)
- Geographical mobility: Use of detailed migration records
 - →How to model?! Time trend x life course x geographical mobility (local time, household time, individual time)

4.2 Geographical mobility % Distribution of Reasons of Out-migration by Sex: Shimomoriya and Niita 1716-1870

Reason	Male	Female
Marriage/adoption	10.4	45.1
Service	65.1	34.9
Absconding	16.8	12.6
Change of legal domicile	5.9	5.9
Other	1.8	1.5
(Number of events)	(1,598)	(1,131)

Tsuya NO, Kurosu S. Social class and migration in two northeastern Japanese villages, 1716–1870. *History of the Family*. 2013;18:434–455.

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N.S. Sand Frank Containing

Linking past to present... Koriyama: Now and then (around 1800)





+返舎一九『方言修行金草鞋(むだしゅぎょうかねのわらじ)』(文化10(1813)年~天保5(1834)年刊)