The Nexus among Ageing, Migration and Economic Development

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Presented at NATSEM HDR Workshop “Current Research on Economic Development in Indonesia, University of Canberra, Australia, 13 September 2012
3 possible patterns among migration, ageing, and economic development

Statistical analysis on the nexus: An Indonesian case at district level
Ageing population is the ongoing process at the aggregate level referring to the changes in age structure of a population.

It is indicated by the increasing trend in the absolute and relative number of older persons in a population.
Determinants of Ageing Population

- Trend in Fertility rate
- Trend in Mortality rate
- Trend in migration rate

- **Fertility rate**
  It’s NOT because of low fertility, but it is because of a declining trend in fertility rate. It has been considered that the declining trend in fertility as the primary cause of ageing population.

- **Mortality rate is the second cause.**
  BUT, when fertility is low, there is no room to decline further. Then, mortality takes a turn, especially mortality decline at older ages plays more important role.
Migration rate, either in-/out-migration, can be another important factor.

In some areas, especially small countries and sub-nationals, trend in migration rate can play more important role on ageing population than that of mortality rate.

Therefore, relationships among the 3 variables (migration, ageing, and development) are important.
3 Possible Patterns among the 3 Variables

1. slowed ageing process in rich economies
2. accelerated ageing process in poor economies
3. deferred ageing process in rich economies

Ananta and Arifin (2009)
1. Slowed ageing process in rich economies

- Fertility and mortality rates have been low for a relatively long period.
- The percentage of older persons has been rising.
- However, the significant inflow of migrants has slowed down the process of ageing population.
- As a result, it delays the transformation into an old population.
1. Slowed ageing process in rich economies

- In-migration has functioned to fill in the labour shortage and is instrumental for the short and medium terms.
- In-migration produces social-political tensions due to cultural differences.
- Singapore is an example
Singapore case
2. Accelerated ageing process in poor economies

- Poverty-driven out-migration of the young people leaves older persons and children behind.
- Fertility rate may even decline faster if the outmigration involves women at reproductive ages, it then accelerates ageing population.
- Meanwhile, the influx of migration of older persons into poorer economies may further accelerate the ageing population.
2. Accelerated ageing process in poor economies

- The accelerated ageing population in poor economies can result in worse welfare for older persons.
- The regency of Gunung Kidul, Yogyakarta province is an example.
- Iban communities in Kapit, Kanowit, and Sibu of Sarawak (Ling, 2009)
- Kelantan, Trengganu, Pahang of Malaysia (Hassan, 2004)
In 2000, 10.5% of the Gunung Kidul’s population was aged 65 and above, making it the highest among districts.

Suicide case is relative high
3. Deferred ageing process in rich economies

- In contrast to the second model, the advancement in the economy becomes the dominant magnet for people seeking jobs there. Influx of migrants occurs earlier.
- Migrants are the engine of growth
- Fertility and mortality rates have been low, due to high in-migration, ageing population is deterred.
3. Deferred ageing process in rich economies

- As in the first model, the influx of migrants creates social-political tensions and jealousy.
- Brunei is an example
- Jakarta, and Kuala Lumpur are other examples
Statistical Analysis on the Nexus of Migration, Ageing and Economic Development

Ananta and Arifin (2010)
This study attempts to examine the relationship among migration, ageing, and economic development.

We conduct an econometric test on the relationships among the 3 variables to examine the possible causality among them.
Limitations

- This study limits the discussion on in-migrants, and therefore it excludes part of the discussion of out-migration in the second pattern.

- Other studies should follow to examine the second pattern and combine the three.
The Triangle

Economic Development

Ageing Population

Migration
The 2000 Indonesian population census data set, the first one provides a rich and reliable data set on migration with district as the unit of analysis.

A migrant in district A is here defined as an individual who lived in district A in 2000 but did not live in district A in 1995. Therefore, the data used here is the number of migrants in a district, comprising of both inter-provincial and intra-provincial migrants for the period of 1995-2000.

The proportion of migration is defined as the percentage of total migrants to the total population aged 5 years old and over in a district.
Population ageing is here defined as the percentage of population aged 65 years old and above to the total population at a particular district.

It is calculated from the 2000 Population census.

Based on this census, Indonesia had 30 provinces and 340 districts (regency/kabupaten and city/kotamadya)
Economic development is a complex, multi-dimensional concept. There is no single variable that can properly indicate economic development.

The narrowest concept defines economic development simply as economic growth and the pre-occupation with measurement of income, and production, of the region.

In this paper, the 1998 per capita GDP at the district level is used as an indicator of economic development.
Two-stage Simultaneous Model:

- **3 Endogenous variables**
  - ageing, in-migration, and per capita GDP
- **9 Exogenous variables**:  
  - 2 demographic variables (fertility and mortality),  
  - 2 socio-cultural variables (ethnicity and religion),  
  - 2 geographical variables (urbanisation rate and living in the Island of Java),  
  - 3 socio-economic variables (education, working in formal sector, and working in manufacturing sector).
3 equations:
Age = f (Mig, region, urban, fertility, mortality)
Mig = g (Dev, Age, region, urban, religion, ethnicity)
Dev = h (Mig, Age, region, urban, education, formal, manufacturing)

- Age is ageing
- Mig is in-migration,
- Dev is economic development
Exogenous variables

- Fertility, measured by TFR
- Mortality, measured by e0
- Religion, measured as % of Muslims
- Ethnicity, measured as % of Javanese
- Urbanisation rate
- A dummy variable (region), having value of 1 if living in the Island of Java, and 0 otherwise
- Education, measured as % of those completed senior high school or above
- Formal, measured as % of labour force working in formal sector
- Manufacturing, measured as % of labour force working in manufacturing sector.
### Impact of migration on ageing (Ageing equation)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1 Coefficients</th>
<th>Model 4 Coefficients</th>
<th>Model 5 Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>5.59</td>
<td>-2.61</td>
<td>-1.59</td>
</tr>
<tr>
<td>in-migrants</td>
<td>-0.22</td>
<td>-0.28</td>
<td>-0.18</td>
</tr>
<tr>
<td>TFR</td>
<td>-</td>
<td>-0.90</td>
<td>-0.94</td>
</tr>
<tr>
<td>e0</td>
<td>-</td>
<td>0.17</td>
<td>0.15</td>
</tr>
<tr>
<td>Java Island</td>
<td>-</td>
<td>-</td>
<td>0.76</td>
</tr>
<tr>
<td>Urbanisation</td>
<td>-</td>
<td>-</td>
<td>-0.01</td>
</tr>
</tbody>
</table>

Note: All variables are significant at 1%

Among 3 demographic variables, fertility has the largest coefficient, followed by migration and, then, mortality.

The impact of rising in-migration may have offset the impact of lower mortality on ageing proportion. In other words, in-migration may have slowed down or even deferred the ageing process.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 4 (Table 6)</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>2.71</td>
<td>0.210</td>
</tr>
<tr>
<td>Muslim (%)</td>
<td>0.02</td>
<td>0.161</td>
</tr>
<tr>
<td>Javanese (%)</td>
<td>0.01</td>
<td>0.314</td>
</tr>
<tr>
<td>Ageing</td>
<td>-0.20</td>
<td>0.648</td>
</tr>
<tr>
<td>Per cap GDP*</td>
<td>4.98E-07</td>
<td>0.000</td>
</tr>
<tr>
<td>Java Island</td>
<td>-4.13</td>
<td>0.001</td>
</tr>
<tr>
<td>Urbanisation</td>
<td>0.05</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Controlling by other variables, ageing does not have any direct impact on migration.

Development positively affects in-migration.

Economic development is a magnet for in-migration.
### Impact of migration and ageing on development

<table>
<thead>
<tr>
<th></th>
<th>Coefficients</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>5560476.3</td>
<td>0.162</td>
</tr>
<tr>
<td>in-migrants</td>
<td>-225507.7</td>
<td>0.574</td>
</tr>
<tr>
<td>Ageing</td>
<td>-1760181.2</td>
<td>0.025</td>
</tr>
<tr>
<td>Manufacturing*</td>
<td>65088.5</td>
<td>0.640</td>
</tr>
<tr>
<td>Formal sector</td>
<td>157084.3</td>
<td>0.080</td>
</tr>
<tr>
<td>Education</td>
<td>626805.2</td>
<td>0.001</td>
</tr>
<tr>
<td>Java Island</td>
<td>2805203.7</td>
<td>0.272</td>
</tr>
<tr>
<td>Urbanisation</td>
<td>-205390.3</td>
<td>0.000</td>
</tr>
</tbody>
</table>

* Per Capita GDP without Oil and Gas

Migrants do not seem to have been an engine of economic development as in-migration is not significant.

Ageing has significant and negative impact on economic development.

An ageing society is a burden for economic development.
These complex relationships deserves further research taking into account the role played by the out-migration and other omitted variables.
THANK YOU

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