Urbanization in Tanzania

*Phase 2: Part 2*

*The Regions*

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Propensities reminder

- $Prom = \text{Propensity for rural out-migration}$
  
  \[
  Prom = \frac{100 \times (ExpRurPop - ActRurPop)}{ExpRurPop}
  \]

- $Prim = \text{Propensity for regional in-migration}$
  
  \[
  Prim = \frac{100 \times (ActRegPop - ExpRegPop)}{ExpRegPop}
  \]

- $Puim = \text{Propensity for urban in-migration}$
  
  \[
  Puim = \frac{100 \times (ActUrbPop - ExpUrbPop)}{ExpUrbPop}
  \]
Definition of Mainland Regions

- 17 regions in 1967
- 20 regions in 1978 and 1988
- 20 regions in 2002 (but Manyara separated from Arusha for census report)
- 25 regions in 2012 (New regions: Geita, Katavi, Njombe, Simiyu)
- Analysis based on 20 regions of 2002 (19 when Pwani combined with Dar)
Growth of regional capitals

Regional Capitals - Populations (log scale)
Growth of other urban areas

Mainland Tz Population Trends (log scale)

- Dar Urban
- Reg Caps
- UrbNotRC
- Urban s/total
- Rural s/total
- TotPop
Regional annexes

• Each regional annex contains:
  – Information concerning the physical and other characteristics of the region;
  – Information about its infrastructure;
  – Its urban populations with a number of derived measures;
  – Information related to its rural economy; and, finally
  – Information related to its urban economy.
Prom due to ‘Rural Push’? (78)
Prom due to ‘Rural Push’? (88)
Prom due to ‘Rural Push’? (02)
But ‘Urban Pull’ matters too ...

• Simple economic theory:
  – Rural sector: Population growth => Lower marginal product (unless more land and/or better technology)
  – Urban sector: Population growth => Higher marginal product (agglomeration effects) BUT must be supported by investment in industry and infrastructure

• Migration will tend to equalize marginal products (subject to frictions e.g. distance)
A crude specification

- \( Prom = a + b \cdot LandDens + c \cdot Rain + d \cdot UrbPop + e \cdot DistDar \)
- Rationale:
  - Higher LandDens \( \Rightarrow \) higher Prom
  - Higher Rainfall \( \Rightarrow \) lower Prom
  - Higher UrbPop \( \Rightarrow \) higher Prom
  - Higher DistDar \( \Rightarrow \) lower Prom
- Refugee adjustment
- Mining dummy
Variables definitions

• \textit{LandDens} = \text{RurPop/Area Planted (base year)}
• \textit{Rain} = \text{Av annual rainfall (mm) (period)}
• \textit{UrbPop} = \text{Urban population (base year)}
• \textit{DistDar} = \text{Distance from regional capital to Dar (km) (constant)}
## Regression results (1) Prom

<table>
<thead>
<tr>
<th>Period</th>
<th>LandDens (b)</th>
<th>Rainfall (c)</th>
<th>LnUrbPop (d)</th>
<th>DistDar (e)</th>
<th>Mining (dummy)</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978-88</td>
<td>1.32* (0.68)</td>
<td>16.9* (5.73)</td>
<td>-3.36 (2.39)</td>
<td>-8.45* (3.85)</td>
<td>1.78 (3.88)</td>
<td>0.44</td>
</tr>
<tr>
<td>1988-2002</td>
<td>1.59* (0.77)</td>
<td>-3.49 (7.15)</td>
<td>-4.29 (3.71)</td>
<td>-20.6* (6.37)</td>
<td>-0.97 (6.87)</td>
<td>0.62</td>
</tr>
<tr>
<td>2002-2012</td>
<td>-2.65 (2.39)</td>
<td>2.98 (7.52)</td>
<td>2.47 (3.77)</td>
<td>-19.5* (7.24)</td>
<td>6.13 (7.28)</td>
<td>0.65</td>
</tr>
</tbody>
</table>
## Regression Results (2) Prim

<table>
<thead>
<tr>
<th></th>
<th>LandDens</th>
<th>Rain</th>
<th>LnUrbPop</th>
<th>DistDar</th>
<th>Mining</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>PrimR</td>
<td></td>
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<tr>
<td>1978-1988</td>
<td>1.08</td>
<td>-13.3*</td>
<td>8.57*</td>
<td>8.87*</td>
<td>-2.90</td>
<td>0.44</td>
</tr>
<tr>
<td></td>
<td>(0.76)</td>
<td>(6.45)</td>
<td>(2.70)</td>
<td>(4.34)</td>
<td>(4.37)</td>
<td></td>
</tr>
<tr>
<td>1988-2002</td>
<td>-1.53</td>
<td>0.026</td>
<td>12.2*</td>
<td>22.8*</td>
<td>-4.72</td>
<td>0.56</td>
</tr>
<tr>
<td></td>
<td>(0.86)</td>
<td>(7.96)</td>
<td>(4.12)</td>
<td>(7.08)</td>
<td>(7.64)</td>
<td></td>
</tr>
<tr>
<td>2002-2012</td>
<td>0.44</td>
<td>9.85</td>
<td>12.8*</td>
<td>17.7*</td>
<td>-14.5*</td>
<td>0.68</td>
</tr>
<tr>
<td></td>
<td>(2.14)</td>
<td>(6.74)</td>
<td>(3.38)</td>
<td>(6.49)</td>
<td>(6.52)</td>
<td></td>
</tr>
</tbody>
</table>
Other variables tested

• *LandDens2* = RurPop/Area suitable for annuals (WB, 1994) (constant)
• *Climate* = PDSI
• *UrbPop* = Employment; UrbEmp (78)
• *DistDar* = Popn wtd average distance; Roads/sq.km
• 2001 HBS urban/rural differential
• All judged to be inferior
Why not use *Puim*?

- Regression produced no significant coefficients.
- Reasons for growth often particular to each large city.
- High *Puim* found in some surprising regions...
## Regions ranking high on Puim

<table>
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</thead>
<tbody>
<tr>
<td>Region (Capital &amp; its growth rate)</td>
<td>Puim [Rank]</td>
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<td>Puim [Rank]</td>
<td>Region (Capital &amp; its growth rate)</td>
<td>Puim [Rank]</td>
<td></td>
</tr>
<tr>
<td>Mbeya (Mbeya 5.5%) (OtherUrb 21.1%)</td>
<td>108.4 [1]</td>
<td>Arusha (Arusha 8.8%) (OtherUrb 9.4%)</td>
<td>125.0 [1]</td>
<td>Kagera (Bukoba 8.5%) (OtherUrb 8.0%)</td>
<td>69.1 [1]</td>
<td></td>
</tr>
<tr>
<td>Kilimanjaro (Moshi 6.4%) (OtherUrb 16.1%)</td>
<td>85.5 [2]</td>
<td>Mara (Musoma 3.1%) (OtherUrb 11.8%)</td>
<td>71.0 [2]</td>
<td>Mbeya (Mbeya 5.2%) (OtherUrb 10.5%)</td>
<td>63.6 [2]</td>
<td></td>
</tr>
<tr>
<td>Mwanza (Mwanza 4.5%) (OtherUrb 16.3%)</td>
<td>74.2 [3]</td>
<td>Shinyanga (Shinyanga 3.3%) (OtherUrb 7.2%)</td>
<td>48.4 [3]</td>
<td>Ruvuma (Songea 7.5%) (OtherUrb 6.7%)</td>
<td>53.2 [3]</td>
<td></td>
</tr>
<tr>
<td>Arusha (Arusha 6.4%) (OtherUrb 12.6%)</td>
<td>67.3 [4]</td>
<td>Iringa (Iringa 2.4%) (OtherUrb 9.6%)</td>
<td>48.2 [4]</td>
<td>Rukwa (Sumbawanga 5.2%) (OtherUrb 8.0%)</td>
<td>50.9 [4]</td>
<td></td>
</tr>
<tr>
<td>Ruvuma (Songea 11.4%) (OtherUrb 4.1%)</td>
<td>58.8 [5]</td>
<td>Singida (Singida 2.8%) (OtherUrb 8.5%)</td>
<td>45.9 [5]</td>
<td>Pwani/Dar (Dar es Salaam 6.5%) (OtherUrb 6.1%)</td>
<td>43.7 [5]</td>
<td></td>
</tr>
</tbody>
</table>
Is there a better approach?

• Yes: better would be a general equilibrium model which could take fuller account of rural/urban interactions (e.g. Adam et al, 2014)

• Also attractive might be dynamic modelling

• Beyond resources of this project (also would need to overcome data limitations)

• A challenge for the next generation of urban researchers in Tanzania?
What have we learned?

• Census-based database on migration and urbanisation established – help yourself!
• Some evidence for ‘Rural Push’ in 1978-88 and 1988-2002; pressure of population on land and other resources a cause for concern
• A large urban population favours regional in-migration
• Greater distance from Dar discourages out-migration
• But methods not robust enough to be very confident
• More case studies needed to help identify drivers of migration and urbanisation in Tanzania – Regional Annexes provide a starting point
Issues for discussion

• Can the data on regional capitals and regional populations be further improved?
• What are the drivers of high rural out-migration from some regions (‘Rural Push’)? Do they differ from period to period? Can the analysis based on equation (1) be improved?
• How strong is the evidence for ‘Urban Pull’ in some regions? How convincing is the analysis based on equation (2)?
• How can we explain the surprisingly high *Puim* of some regions in Table 4?
• The analysis in this paper is weak on real economic variables: e.g. Relative prices, wages and employment, transport costs, etc. What can be done to provide more robust analysis?
• What are the priorities for future research? Would more case studies of larger towns be helpful?

[More issues?]