Demography as Strategic Foresight

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Objectives:

1. Provide quick background on the age-structural theory of state behavior.

2. Review its 5 basic statistical relationships in “age-structural time”.

3. Review its potential for statistical forecasting.

4. If there is time, review its 10 fundamental “rules”.
Background: Origins of age-structural theory
The Anticipatory Fields of Intelligence
(*Estimative, Early Warning, Foresight*)

Adapted from: J.M. Schmidt, 2015
Features:

- **Reductionist:** Focuses on a fundamental relationship and builds up; appears unconcerned with causality.

- **Core of the model is demographic:** relies on estimates and projections by the UN Population Division (alternatively, the US Census Bureau, International Program Center).

- **Relies heavily on the scientific method:** Models generated by age-structural modeling (logistic regression in the age-structural domain), and then tested, modified, retested.
Key Points

• **Age structural transition:** transition from youthful to more mature age structures (the *Global Trends* four phases).

• **Age-structural domain** *(age-structural time vs. chronological time).*

• **Age-structural theory of state behavior** (generating social, economic, and political expectations at various stages of the age-structural domain).

• **Age-structural theory is a scientific program** (testable statistical expectations) which differentiates it from explanatory narratives that are untestable.

• **Ideology** *(politico-secular as well as politico-religious)* can over-power the expectations associated with demography. Some strong religious ideologies manipulate fertility (and therefore, age structure).
Background: Elements of age-structural theory and their audience

- **Statistical Element**: Generating continuous age-structural functions associated with transitions/events. (driven by the computational and non-computational elements).

- **Computational Element**: Generating tests of theory and forecasts (checking the statistical and non-computational elements).

- **Non-computational Element**: Generating fundamental expectations for analysts, “the 10 Rules.” Separating which countries perform as expected from those that are “behaving unexpectedly” (checking the statistical and computational elements).
The Age-structural Transition

2015

Data: UN Population Division, 2015 Rev.
The Age-structural Transition
2015

Data: UN Population Division, 2017 Rev.
4 Phases of the Age-structural Transition

- **Youthful**: ≤ 25.5
- **Intermediate**: 25.6 to 35.5
- **Mature**: 35.6 to 45.5
- **Post-mature**: > 45.6

**Median age (in years)**

**Age-structural Timeline (M)**
NIC’s Four Age-structural Phases

• **Youthful (YTH):** rapid growth among children, adolescents, young adults; low levels of human capital and institutional capacity (typically low legitimacy). Difficult to generate legitimacy from institutions (because of the large load on them, and low levels of human capital)

• **Intermediate (INT):** *The demographic window*; low levels of dependency; rapidly increasing human capital and institutional capacity (typically gains in legitimacy).

• **Mature (MAT):** fading of the demographic advantages; society and economy directed by the institution and capacity generated during the window. Need to be preparing institutions/society for the next phase.

• **Post-mature (PMT):** challenges from large proportion of seniors in adult population; declining workforce size (maybe); unprepared institutions (?); ethnic shifts due to immigration (?).
<table>
<thead>
<tr>
<th>Phase</th>
<th>Institutional Capacity</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Youthful (YTH)</td>
<td>Weak</td>
<td>Low or Lower-middle</td>
</tr>
<tr>
<td>Intermediate (INT)</td>
<td>Upwardly mobile</td>
<td>Lower Middle $\rightarrow$ Upper Middle</td>
</tr>
<tr>
<td>Mature (MAT)</td>
<td>Depends on INT institution building</td>
<td>Upper Middle or High</td>
</tr>
<tr>
<td>Post-mature (PMT)</td>
<td>Depends on MAT performance</td>
<td>???</td>
</tr>
</tbody>
</table>
Sub-Saharan Africa and the Demographic Window

TFR, 2010-15 vs. Median Age, 2015

Age-structural Transition
Exceptional factors:

- States with populations less 5.0 million (small-population states [SPS])

- States that are reliant on oil and/or mineral wealth (rents >15% of GDP, resource reliant states [RRS])

- Single-party regimes (ideological political monopolies [IPM]).

- States that are a composite of demographically dissimilar nations [DDN] (large gaps in fertility, growth, age-related mortality, age structure, net migration).
Tunisia

1965

Median age, 17.1
Pop: 4.5 million

1990

Median age, 20.9
Pop: 8.2 million

2010

Median age, 29.0
Pop: 10.6 million

2025

Median age, 35.6
Pop: 12.3 million

Age-structural Change
1995 to 2010
Sub-state Model
Sub-state age-structural model

![Sub-state age-structural model diagram](image-url)

- Youthful Minority: Moller, 1968 ("Youthful Instability")
- Mature Minority: Chua, 2004 ("World on Fire")
- Mature Majority: Leuprecht, 2010 ("Demographic Security Dilemma")
- Youthful Majority: Leuprecht, 2010 ("Demographic Integration")
Classic Youth bulge

“Youthful Instability”
(Moller, 1968)

Rapidly growing minority

“Demographic Security Dilemma”
(Leuprecht, 2010)

Wealthy minority

“World on Fire”
(Chua, 2004)

“Demographic Integration”
The diagram illustrates the historical timeline and conflict dynamics between different regions and their minority and majority populations from 1960 to 2015. The timeline is divided into Youthful and More Mature stages, with specific events and conflicts highlighted:

- **Iran** 1988: Expulsion of Han-Vietnamese 1979-94
- **Burma** 1980: Multiple Ethnic conflicts
- **Lebanon** 1960: Hezbollah
- **Vietnam** 1975: Expulsion of Han-Vietnamese 1979-94
- **Burma** 2015: Attacks on Rohingya
- **Vietnam** 2015: Peaceful transition
- **Iran** 2015: Ethnic Civil War

The diagram also notes a widespread fertility decline in some regions.
Methods: Age-structural Modeling
Building Cumulative Distribution Functions

**Child Survival: Upper-middle category (<25 deaths per 1000 births)**

### Median Age (in years)

**Age-structural Transition**

- **YTH**
- **INT**
- **MAT**
- **PMT**

$$f(M) = 0.50$$

$$\frac{dp}{dM}$$
Age Structure & Development

Transitions in:

- Child survival (UN Pop. Div./WHO)
- Late-secondary educational attainment (IIASA/VID)
- Per-capita income (World Bank, WDI)
Political Liberalization Transition

Freedom House freedom status categories, published annually by Freedom House, based on the average of their political rights (PR) and civil liberties (CL) scores (average is called the freedom score).

FREE: Freedom Scores 2.5 to 1.0
PARTLY FREE: Freedom Scores 5.0 to 3.0
NOT FREE: Freedom Scores 7.0 to 5.5

Political Stability Transition

UCDP/PRIO Armed Conflict Database, intra-state, government-focused conflicts (>25 battle-related deaths per year, where the state is one of the armed parties)

Note: Not a separatist (territorial) conflict.

Conflict History Classes (same type of conflict during prior 4-year)

\[
\begin{align*}
R_{\text{Abs}} & : 0 \text{ years of conflict (absence)} \\
R_{\text{Int}} & : 1 \text{ or } 2 \text{ years of conflict (intermittence)} \\
R_{\text{Per}} & : 3 \text{ or } 4 \text{ years of conflict (persistence)}
\end{align*}
\]

Revolutionary Conflict: empirical evidence

![Graph showing proportions of revolutionary conflict over time, with categories for youthful, youthful - SP (<5 million population), intermediate, and mature.]
Territorial (ethnic separatist) Conflicts: Theory

4-year conflict history types

Onset: 0 conflict yrs.
Intermittent: 1 or 2 conflict yrs.
Persistent: 3 or 4 conflict yrs.

Cincotta, in press
Territorial Conflict: empirical evidence

![Graph showing the proportion of territorial conflict over different years and population categories.](image)
Demographic Window: Upper-Middle$_{50}$
Products: Forecasts and related materials
Issues:

- **Working in age-structural time** (an advantage). Coming up with a narrative (a disadvantage).

- **Law of small numbers**: statistical issue; regions more effective than individual states.

- **Other factors**: Regimes; ideologies; separatist conflicts (and other sub-state issues); neighborhood influences.

- **Models naïve to sub-state data**: Missing sub-state demography and other sub-state data.
Age-structural Change
1995 to 2010

<table>
<thead>
<tr>
<th>Category</th>
<th>Median Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Youthful</td>
<td>25 or younger</td>
</tr>
<tr>
<td>Intermediate</td>
<td>26 to 35</td>
</tr>
<tr>
<td>Mature</td>
<td>36 to 65</td>
</tr>
<tr>
<td>Post-mature</td>
<td>66 or older</td>
</tr>
</tbody>
</table>

1995

2010
Age-structural Change
2015 to 2035

Data: UN Population Div., 2015

Cincotta, 2015 (updated)
## Middle East – North Africa 2017

### Intra-state Conflicts: 2016 (UCDP/PRIO)

<table>
<thead>
<tr>
<th>Country</th>
<th>FREEDOM Score 2017</th>
<th>Prob. of FREE, 2018</th>
<th>Free50 (year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyprus</td>
<td>1.0</td>
<td>0.79</td>
<td>1984 (Free since 1986)</td>
</tr>
<tr>
<td>Tunisia</td>
<td>2.5</td>
<td>0.64</td>
<td>2010 (Free 2015)</td>
</tr>
<tr>
<td>Iran</td>
<td>6.0</td>
<td>0.61</td>
<td>2014</td>
</tr>
<tr>
<td>Turkey</td>
<td>5.5</td>
<td>0.59</td>
<td>2013</td>
</tr>
<tr>
<td>Israel</td>
<td>2.0</td>
<td>0.57</td>
<td>2006 (Free before 1972)</td>
</tr>
<tr>
<td>Lebanon</td>
<td>5.0</td>
<td>0.56</td>
<td>2016</td>
</tr>
<tr>
<td>Morocco</td>
<td>5.0</td>
<td>0.50</td>
<td>2019</td>
</tr>
<tr>
<td>Algeria</td>
<td>5.5</td>
<td>0.48</td>
<td>2020</td>
</tr>
<tr>
<td>Libya</td>
<td>6.5</td>
<td>0.47</td>
<td>2020</td>
</tr>
<tr>
<td>Bahrain *</td>
<td>6.5</td>
<td>0.45</td>
<td>2023</td>
</tr>
<tr>
<td>Saudi Arabia *</td>
<td>7.0</td>
<td>0.34</td>
<td>2026</td>
</tr>
<tr>
<td>Egypt</td>
<td>6.0</td>
<td>0.34</td>
<td>&gt;2040</td>
</tr>
<tr>
<td>Jordan</td>
<td>5.0</td>
<td>0.25</td>
<td>2035-40</td>
</tr>
<tr>
<td>Oman *</td>
<td>5.5</td>
<td>0.25</td>
<td>&gt;2040</td>
</tr>
<tr>
<td>Qatar *</td>
<td>5.5</td>
<td>0.21</td>
<td>&gt;2040</td>
</tr>
<tr>
<td>Kuwait *</td>
<td>5.0</td>
<td>0.20</td>
<td>&gt;2040</td>
</tr>
<tr>
<td>Syria</td>
<td>7.0</td>
<td>0.20</td>
<td>2035-40</td>
</tr>
<tr>
<td>Yemen</td>
<td>6.5</td>
<td>0.16</td>
<td>&gt;2040</td>
</tr>
<tr>
<td>Iraq</td>
<td>5.5</td>
<td>0.16</td>
<td>&gt;2040</td>
</tr>
<tr>
<td>UAE *</td>
<td>6.0</td>
<td>0.14</td>
<td>&gt;2040</td>
</tr>
</tbody>
</table>

### Summary of Model Expectations

- **FREE**: Highly Ideological Political Monopoly
- **PARTLY FREE**: Led by Revolutionary
- **NOT FREE**: Led by Charismatic Reformer

- **Median age, 29 years (FREE50)**
- **Median age, 26 years**
## Latin America & Caribbean 2017

**Intra-state Conflicts: 2016 (UCDP/PRIO)**

<table>
<thead>
<tr>
<th>STATE (MENA)</th>
<th>(1) Freedom Score 2017</th>
<th>(2) Prob. of FREE, 2018</th>
<th>(4) Free&lt;sub&gt;50&lt;/sub&gt; (year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cuba</td>
<td>6.5</td>
<td>0.92</td>
<td>1993</td>
</tr>
<tr>
<td>Uruguay</td>
<td>1.0</td>
<td>0.76</td>
<td>1970</td>
</tr>
<tr>
<td>Trinidad and Tobago</td>
<td>2.0</td>
<td>0.76</td>
<td>2003</td>
</tr>
<tr>
<td>Chile</td>
<td>1.0</td>
<td>0.75</td>
<td>2001</td>
</tr>
<tr>
<td>Argentina</td>
<td>2.0</td>
<td>0.62</td>
<td>2006</td>
</tr>
<tr>
<td>Brazil</td>
<td>2.0</td>
<td>0.66</td>
<td>2010</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>1.0</td>
<td>0.67</td>
<td>2011</td>
</tr>
<tr>
<td>Colombia</td>
<td>3.0</td>
<td>0.61</td>
<td>2013</td>
</tr>
<tr>
<td>Jamaica</td>
<td>2.5</td>
<td>0.58</td>
<td>2014</td>
</tr>
<tr>
<td>Suriname</td>
<td>2.0</td>
<td>0.51</td>
<td>2018</td>
</tr>
<tr>
<td>Panama</td>
<td>2.0</td>
<td>0.51</td>
<td>2018</td>
</tr>
<tr>
<td>Mexico</td>
<td>3.0</td>
<td>0.49</td>
<td>2020</td>
</tr>
<tr>
<td>Venezuela</td>
<td>5.5</td>
<td>0.47</td>
<td>2020</td>
</tr>
<tr>
<td>Peru</td>
<td>2.5</td>
<td>0.48</td>
<td>2020</td>
</tr>
<tr>
<td>Ecuador</td>
<td>3.0</td>
<td>0.44</td>
<td>2023</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>3.0</td>
<td>0.42</td>
<td>2025</td>
</tr>
<tr>
<td>El Salvador</td>
<td>2.5</td>
<td>0.41</td>
<td>2024</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>4.5</td>
<td>0.36</td>
<td>2024</td>
</tr>
<tr>
<td>Paraguay</td>
<td>3.0</td>
<td>0.39</td>
<td>2028</td>
</tr>
<tr>
<td>Guyana</td>
<td>2.5</td>
<td>0.36</td>
<td>2028</td>
</tr>
<tr>
<td>Bolivia</td>
<td>3.0</td>
<td>0.30</td>
<td>2030-35</td>
</tr>
<tr>
<td>Honduras</td>
<td>4.0</td>
<td>0.33</td>
<td>2030-35</td>
</tr>
<tr>
<td>Haiti</td>
<td>5.0</td>
<td>0.30</td>
<td>2030-35</td>
</tr>
<tr>
<td>Guatemala</td>
<td>4.0</td>
<td>0.23</td>
<td>2035-40</td>
</tr>
</tbody>
</table>
World Bank Income Classes

![Graph of World Bank Income Classes with YTH, INT, MAT, PMT categories and probability stacked on the y-axis against median age on the x-axis. Countries AFG, PAK, BNG, TUN, CHI, GER are indicated with vertical lines and shaded areas represent income transitions.](image-url)
<table>
<thead>
<tr>
<th>Transition</th>
<th>Indicator</th>
<th>Year</th>
<th>Median Age</th>
<th>Indicator Value</th>
<th>Category Recorded</th>
<th>Age-structural Model, Statistical Expectations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per-capita Income</td>
<td>GNI/capita, WB Atlas Method</td>
<td>1980</td>
<td>17.3</td>
<td>230</td>
<td>LOW</td>
<td>0.82</td>
</tr>
<tr>
<td>Per-capita Income</td>
<td>GNI/capita, WB Atlas Method</td>
<td>2015</td>
<td>25.6</td>
<td>1190</td>
<td>Lower-Middle</td>
<td>0.20</td>
</tr>
<tr>
<td>Per-capita Income</td>
<td>GNI/capita, WB Atlas Method</td>
<td>2030 (UN medium projection)</td>
<td>33.7</td>
<td>?</td>
<td>?</td>
<td>0.01</td>
</tr>
</tbody>
</table>
World Bank Income Classes, 2017

![Chart showing 5-yr Change in Median Age vs Median Age (years)]
Chronic youthfulness
Rapid aging
Slow aging

In the dem. window
Transitioning

Chronic youthfulness
Rapid aging
Slow aging
The graph illustrates the observed and forecasted states in revolutionary conflict from 1976 to 2036. The y-axis represents the number of states in revolutionary conflict, ranging from 0 to 50. The x-axis shows the years from 1976 to 2036, with markers for every 10 years.

The observed trend shows a peak in revolutionary conflict around 1996, followed by a decline. The forecasts include an upper, middle, and lower scenario, with the upper forecast showing the highest number of states in conflict.

The graph indicates a decrease in revolutionary conflict over the forecast period, with the upper forecast line showing a slight increase by the year 2036.
Table 4. Five-year expected and observed regional counts of states in revolutionary conflict.

<table>
<thead>
<tr>
<th>Regions</th>
<th>1991-95</th>
<th></th>
<th>2011-15</th>
<th></th>
<th>2031-35 (forecast)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Expected</td>
<td>Observed</td>
<td>Expected</td>
<td>Observed</td>
<td>Lower</td>
</tr>
<tr>
<td>East Asia, India, Pacific</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Europe</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Middle East, N. Africa, Central Asia</td>
<td>7</td>
<td>11</td>
<td>6</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>North &amp; South America</td>
<td>6</td>
<td>7</td>
<td>4</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>South &amp; East Africa</td>
<td>6</td>
<td>9</td>
<td>6</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>West &amp; Central Africa</td>
<td>5</td>
<td>4</td>
<td>6</td>
<td>7</td>
<td>6</td>
</tr>
</tbody>
</table>

Cincotta, in press
45 years

East Pakistan 1970

Bangladesh 2015

West Pakistan 1970

Pakistan 2015
Russia

1990

MAT

2020

MAT

2040

MAT

Nigeria

1990

YTH

2020

YTH

2040

YTH

South Africa

1990

YTH

2020

INT

2040

INT
Statistical facts & working hypotheses

(helpful)
Eight Rules of Political Demography (1 through 4)

1. **Expect states at the top of the list**, the most age-structurally mature, to experience the best chance of being a liberal democracy – that is, to be assessed as FREE in Freedom House’s annual Freedom in the World global survey (most analysts consider FREE status to be synonymous with liberal democracy).

2. **Expect states that have a youthful age structure** (below a median age of 25.5 years) to be the least likely to be assessed as FREE and the most likely to be engaged in intra-state conflict of either low or high intensity, as measured by the Uppsala Conflict Data Program.

3. **Where a revolution occurs in a state with a youthful population**, expect either the authoritarian regime to remain in power or to be replaced by another authoritarian regime (typically NOT FREE or low-level PARTLY FREE, as measured by Freedom House).

4. **Expect states that achieve FREE while youthful to lose this rating** within a decade. There is a long history of this effect; Mali is a recent example.
5. Expect states with a population of less than 5 million to be the most likely to break rules 1, 2, 3, and 4 (see the UN Population Division for population data).

6. Expect states that are ruled by an ideological single-party regime or another type of ideological political monopoly – for example, Iran’s theocracy – to mature without liberalization. China and North Korea are other prominent examples, and so far, have had no successional issues.

7. Expect states led by a revolutionary leader (Cuba under Castro, Venezuela under Chavez) or a charismatic reformer (Russia under Putin, Turkey under Erdogan, Singapore under Lee Kwan Yu) to resist attaining FREE. Expect these regimes to have successional problems.

8. Expect a state ruled by a military junta/ruler or absolute monarch to yield to a more democratic regime before the population attains a mature age-structure (before a median age of 35.5 years).
Causal narratives (optional)
Why does median age predict development?
Institutional Capacity (risk deterrence)

Risks of political violence

Risks associated with Post-maturity (?)
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www.politicaldemography.org

newsecuritybeat.org/author/rcincotta
Cincotta, 2015 (updated)

Data: UN Population Div., 2015

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**Category** | **Median Age**
--- | ---
Youthful | Younger than 26
Intermediate | 26 to 35
Mature | 36 to 45
Post-mature | 46 or older
Youthful

Median age: 24 yrs.

Intermediate

Projected Median age: 35 yrs.
Russia 2015

Age

100+
95 - 99
90 - 94
85 - 89
80 - 84
75 - 79
70 - 74
65 - 69
60 - 64
55 - 59
50 - 54
45 - 49
40 - 44
35 - 39
30 - 34
25 - 29
20 - 24
15 - 19
10 - 14
5 - 9
0 - 4

Males
Females

Percent of Total Population
Mature

USA 2015

Males

Females

Age

100+
95 - 99
90 - 94
85 - 89
80 - 84
75 - 79
70 - 74
65 - 69
60 - 64
55 - 59
50 - 54
45 - 49
40 - 44
35 - 39
30 - 34
25 - 29
20 - 24
15 - 19
10 - 14
5 - 9
0 - 4

Percent of Total Population

Projected Median age: 49 yrs.  

Oil + mineral rents > 15% of GDP
Population < 5.0 million
All other countries

exceptions

Age-structural transition

Child Survival:
Upper-middle category
(<25 deaths per 1000 births)