# Global Human Immigration

L. David Roper roperld@vt.edu
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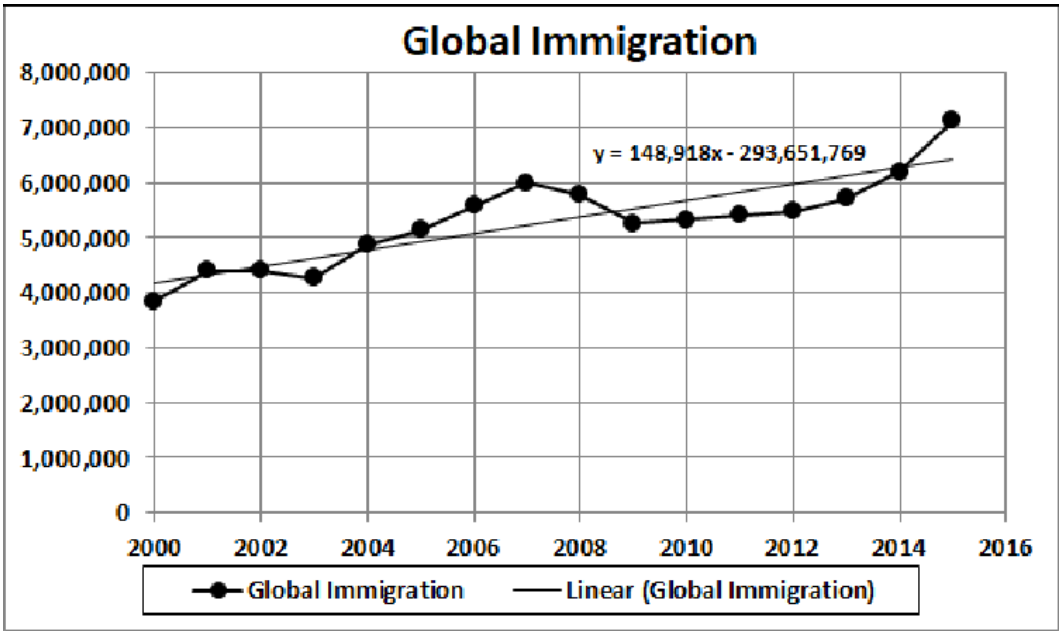
The web page https://stats.oecd.org/Index.aspx?DataSetCode=MIG contains an International Migration Database. It contains inflows of foreign population by nationality (immigration) for 35 countries for years 2000 to 2015. The sums for all 35 states are:

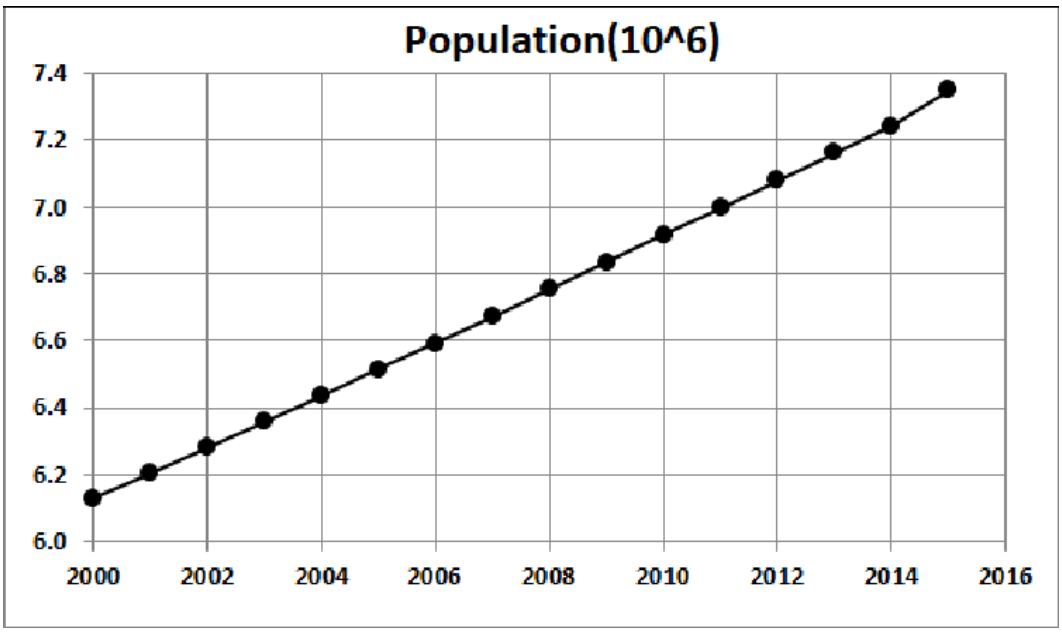
| Year | Immigration |
|---|---|
| 2000 | 3,849,351 |
| 2001 | 4,405,332 |
| 2002 | 4,402,403 |
| 2003 | 4,268,130 |
| 2004 | 4,879,132 |
| 2005 | 5,141,235 |
| 2006 | 5,579,545 |
| 2007 | 5,990,922 |
| 2008 | 5,785,534 |
| 2009 | 5,254,932 |
| 2010 | 5,317,434 |
| 2011 | 5,410,335 |
| 2012 | 5,478,222 |
| 2013 | 5,713,422 |
| 2014 | 6,197,446 |
| 2015 | 7,131,635 |

These data are low values because there are many states not listed and some listed states have no data for some years.

This is a graph of the global-immigration data:



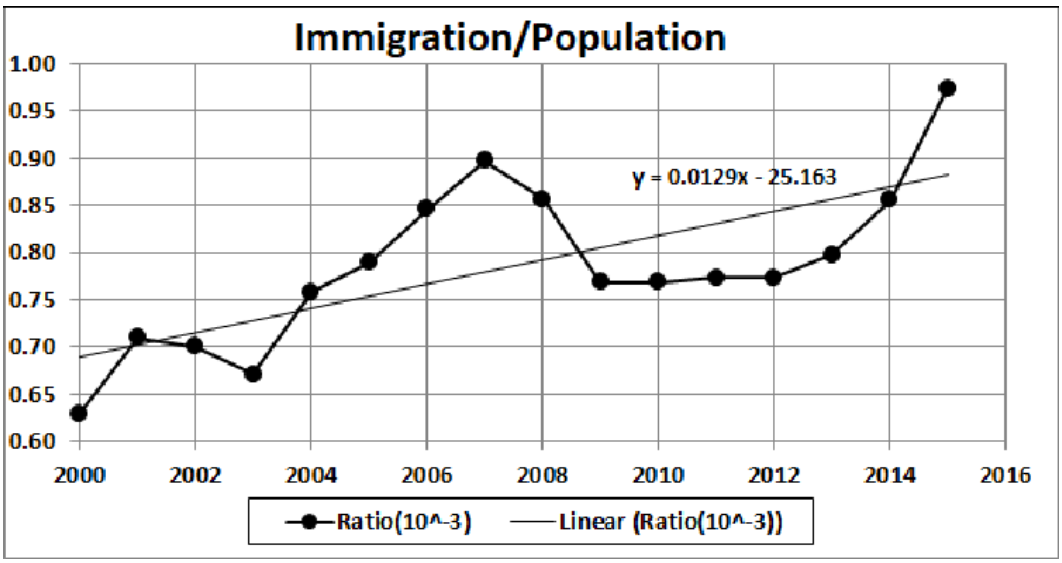
The quantity needed is the ratio immigration/world-population. World population data for 2000-2015 are:



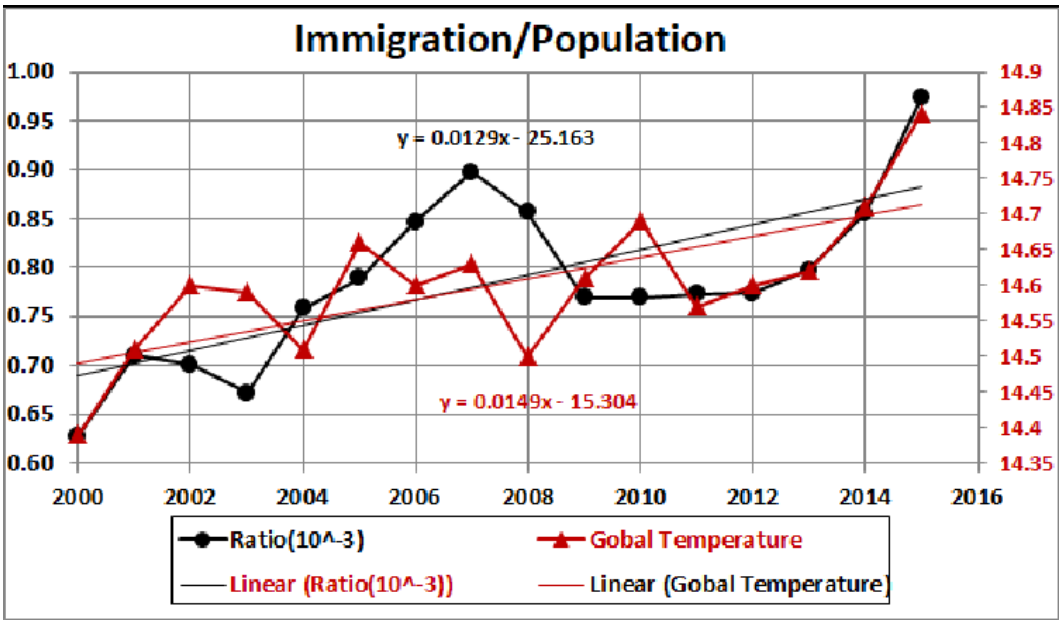

The ratios are:

| Year | Immigration | Population($10^9$) | Ratio($10^{-3}$) |
|---|---|---|---|
| 2000 | 3,849,351 | 6.128 | 0.6282 |
| 2001 | 4,405,332 | 6.204 | 0.7101 |
| 2002 | 4,402,403 | 6.281 | 0.7009 |
| 2003 | 4,268,130 | 6.358 | 0.6713 |
| 2004 | 4,879,132 | 6.436 | 0.7581 |
| 2005 | 5,141,235 | 6.514 | 0.7893 |
| 2006 | 5,579,545 | 6.593 | 0.8463 |
| 2007 | 5,990,922 | 6.673 | 0.8978 |
| 2008 | 5,785,534 | 6.754 | 0.8566 |
| 2009 | 5,254,932 | 6.835 | 0.7688 |
| 2010 | 5,317,434 | 6.916 | 0.7689 |
| 2011 | 5,410,335 | 6.998 | 0.7731 |
| 2012 | 5,478,222 | 7.08 | 0.7738 |
| 2013 | 5,713,422 | 7.162 | 0.7977 |
| 2014 | 6,197,446 | 7.244 | 0.8555 |
| 2015 | 7,131,635 | 7.349 | 0.9736 |

The ratio graph is:

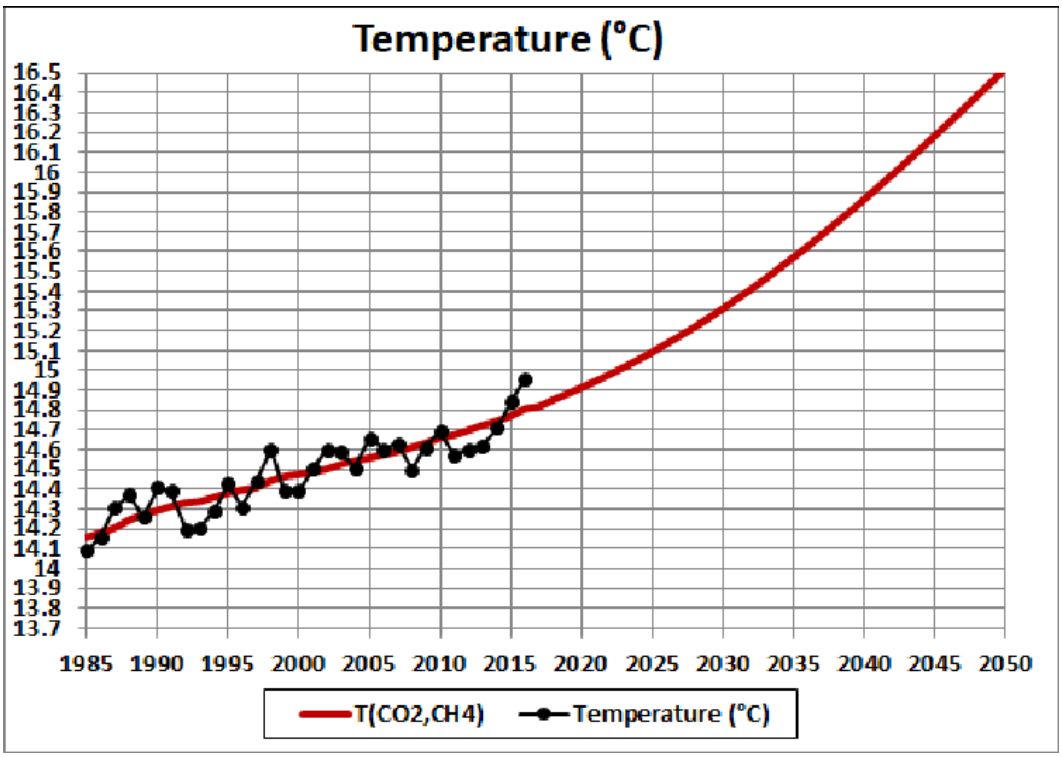



It is interesting to compare the immigration ratio to the [global temperature]:




Of particular note are that the linear-fit slopes are about the same and the rapid rises since 2011 are practically identical when the two items are placed on the same graph.

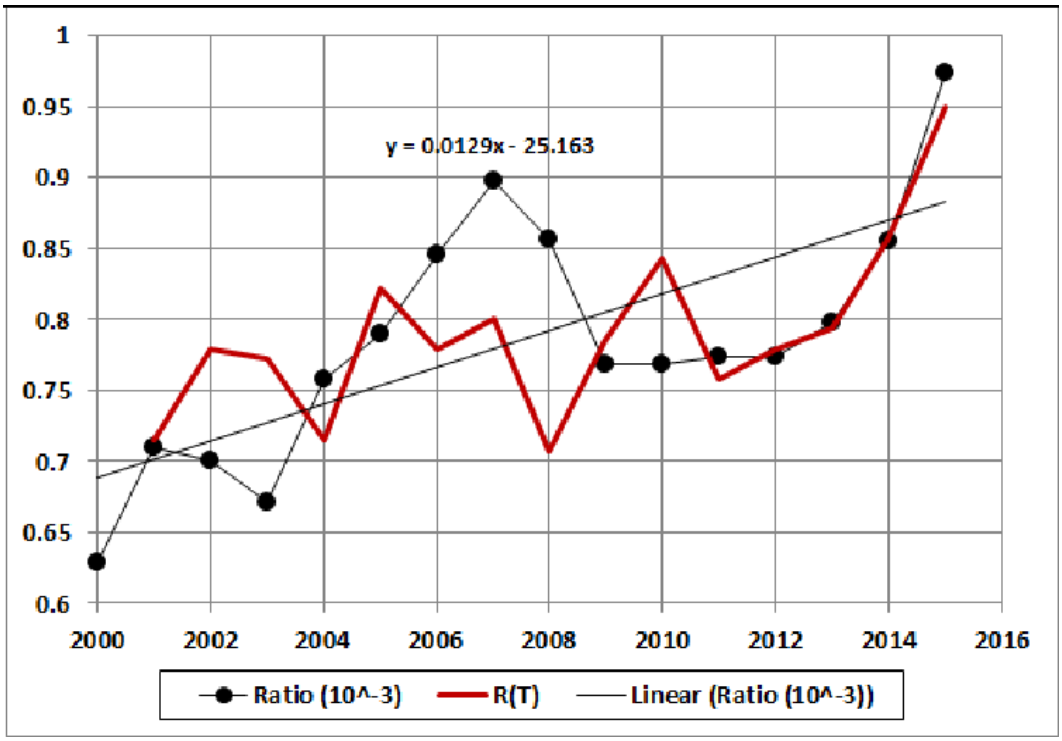
In another study I have projected global temperature to 2050 using $CO_2$ and $CH_4$ emissions:




Using this temperature projection and the fitting equation

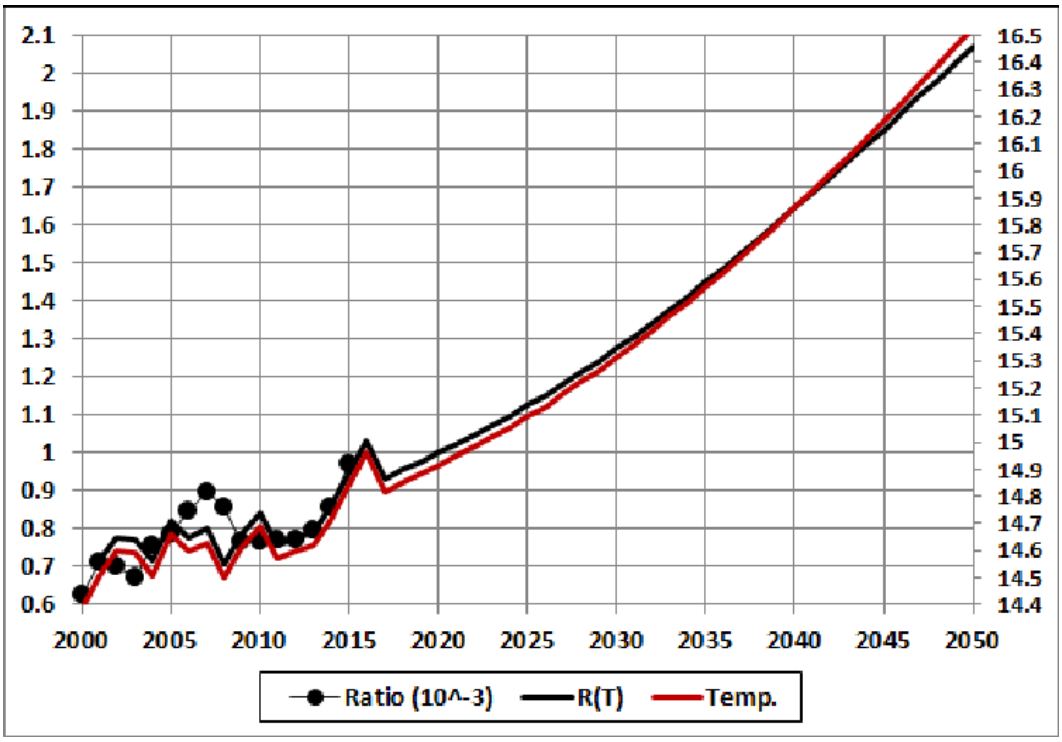
$$dR = R\ \ln(T_f/T_i)/\ln(2)$$

where R = fit parameter, dR = yearly incremental immigration ratio and $T_f/T_i$ = yearly temperature ratio. The fit to ratio data yields R = 7.225:



Although the fit is not very good from 2000 to 2011, the fit appears to be quite good from 2011 to 2015, an apparent change of phase in global temperature. Projecting out to 2050 yields:

Placing projected global temperature and projected immigration ratio on the same graph:




The “jog” at 2017 is the transition from measured temperatures to the temperature projection shown above.

The correlation coefficient between the immigration ratios and global temperatures is **0.692**.

The conclusion is that the recent high immigration is probably due to global warming. If it is due to global warming, the immigration ratio will probably double by year 2050.

## Appendix

The 14 states with over 1,000,000 immigrants over the 2000-2015 years are:

| Country | Immigration | Population($10^6$) | Ratio($10^{-3}$) |
|---|---|---|---|
| **Switzerland** | 1,985,774 | 8.44859 | 235 |
| **Austria** | 1,703,507 | 8.79427 | 194 |
| **Germany** | 13,047,006 | 82.80000 | 158 |
| **Spain** | 7,325,227 | 46.52897 | 157 |
| **Belgium** | 1,548,499 | 11.37097 | 136 |
| **Australia** | 2,921,638 | 24.66650 | 118 |
| **Sweden** | 1,164,346 | 10.06539 | 116 |
| **Canada** | 3,992,508 | 36.67170 | 109 |
| **U.K.** | 6,454,973 | 65.64810 | 98 |
| **Netherlands** | 1,595,814 | 17.15850 | 93 |
| **Italy** | 5,180,739 | 60.52528 | 86 |
| **South Korea** | 4,276,352 | 51.44620 | 83 |
| **Chili** | 1,112,948 | 17.37383 | 64 |
| **U.S.** | 16,493,828 | 325.83900 | 51 |
| **France** | 3,068,303 | 67.08000 | 46 |
| **Japan** | 5,355,166 | 126.67000 | 42 |
| **Sum** | **77,226,628** | **961.08728** | **80** |

Countries with 13% of population take in 91% of immigrants.

Populations from https://en.wikipedia.org/wiki/List_of_countries_and_dependencies_by_population.

## References


- http://www.truth-out.org/opinion/item/42119-climate-change-refugees-face-militarized-borders