# Department of Education Analytics

A data-driven dive into the Philippine education system

*Troy James R Palanca | Jumbo Dumbo Thoughts*

*August 12, 2015*

## Contents



## Abstract

This is the abstract

## Executive Summary

### Context

### Key Findings

### Recommendations

## Data Management

### Data sources

Data was sourced from public sources, mostly from the Department of Education's open data portal. The complete list of data inputs is as follows:

Table 1: Data descriptions and sources

| Dataset | Observation Unit | Applicable Year(s) | Description | Data Source |
|---|---|---|---|---|
| Enrollment | Schools | S.Y. 2011-2012 up to S.Y. 2014-2015 | Enrollment counts for males and females | Department of Education |
| Rooms | Schools | S.Y. 2012-2013 | Room counts per (academic, nonstandard, unused) | Department of Education |
| MOOE | Schools | S.Y. 2014-2015 | MOOE allocated from the national budget | Department of Education |
| Teachers | Schools | S.Y. 2013-2014 | Teacher counts (mobile, regular) | Department of Education |
| School locations | Schools | Recent | Latitude-Longitude pairs for various schools | Department of Education |
| Cities / Municipalities | City / Municipality | Recent | Coordinate pairs and other descriptive information for cities / municipalities | Bangko Sentral ng Pilipinas, PH Open Data Portal |
| PH Shapefile | Country | Accessed 08/11/2015 | Shapefile for the entire country - to be used for mapping | PhilGIS.org |
| PH Provinces Shapefile | Country | Accessed 08/11/2015 | Shapefile for the country divided into provinces - for mapping province-specific information | PhilGIS.org |

### Data processing

Before analysis, we process the various datasets as follows:

- Grade levels in the enrollment data were harmonized across the years (e.g. Grade 7 and Year 1 are combined, and so on).
- Locations were integrated into the masterlist of schools, when available.
- Teachers, rooms, and budget data were integrated into the masterlist of schools, when available.
- Data were saved into RData images for easy access.

```
## Loading required package: grid
```

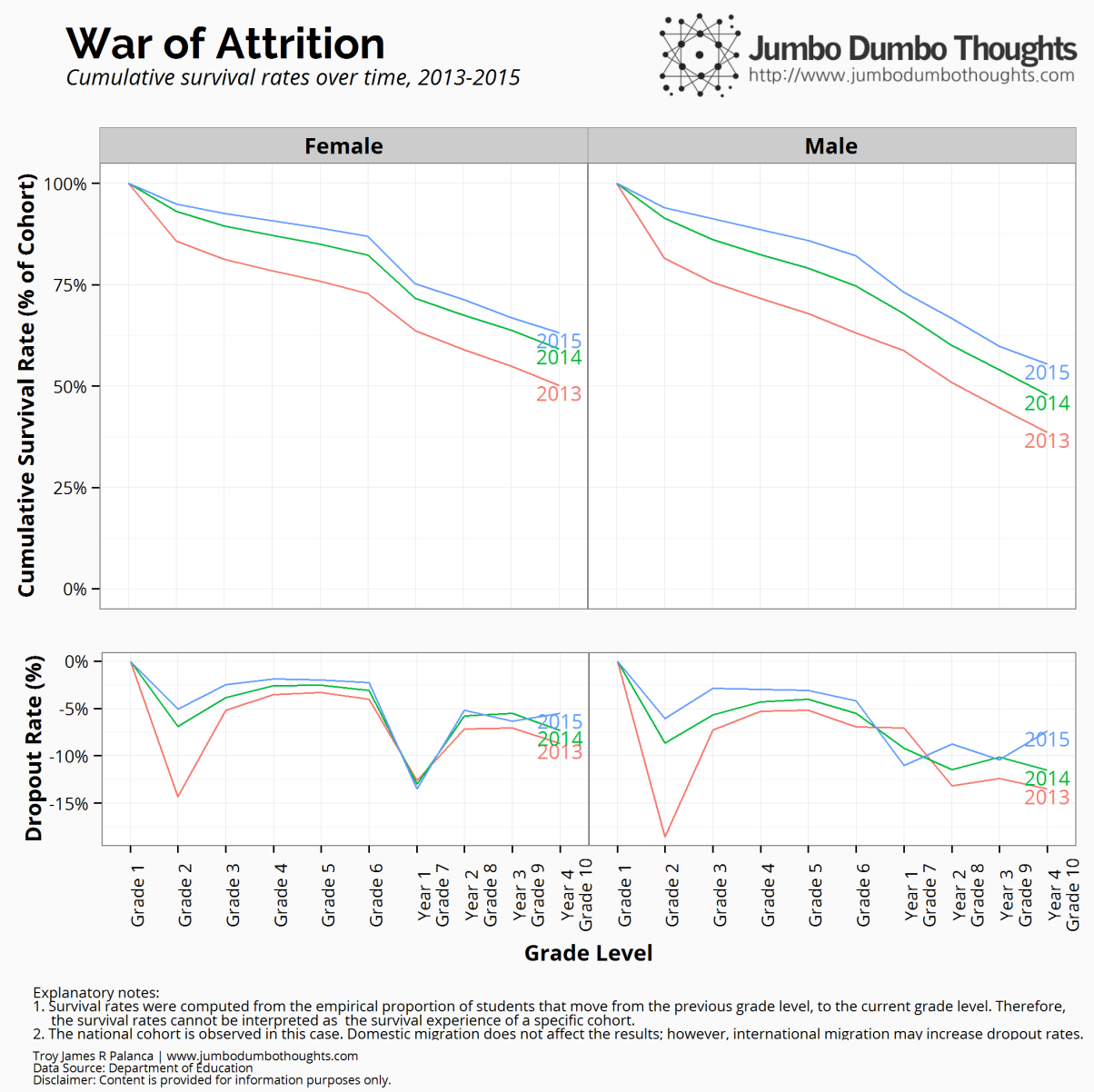
## Survival Analysis

We perform a survival analysis to determine the retention performance of the Philippine education system. Analysis of survival rates allow us to determine the relative performance across genders, schools, years, and grade levels.

## National-level cohort

We first perform a survival analysis of the nationwide cohort.

### Survival rates over time




Cumulative survival rates have been increasing over time, indicating an improvement in overall retention rates for the public school system. On the bottom panel, we can see that the improvement can be attributed to reduction in the dropout rate for Grade 2 students. The transition rate to secondary school does not seem to have improved over time.

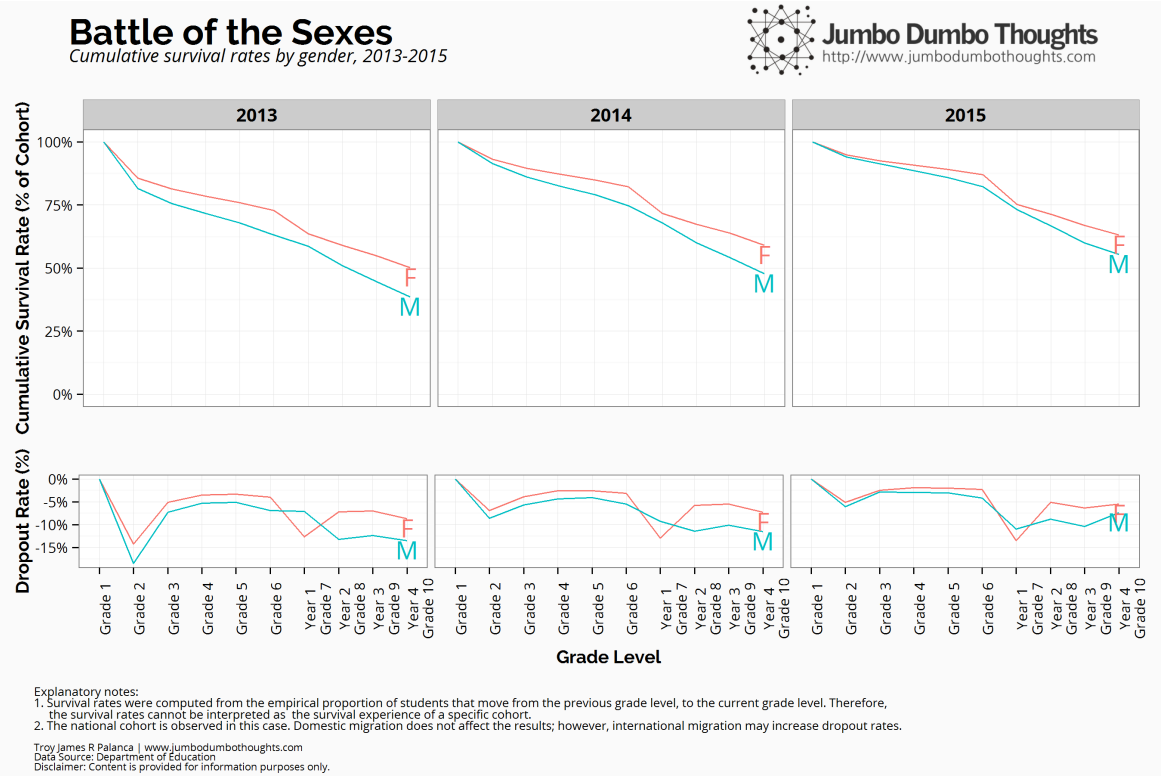
This analysis, however, comes with a few caveats:

- Since we only have raw enrollment numbers for the public school system, we cannot determine whether drops in the cohort size are due to dropout, transfer to private school, or international migration. Despite this, domestic migration will not affect the dropout numbers, since we sum all enrollment figures nationwide.
- In computing cumulative survival rates, we compute the inverse of the shrinkage in cohort size for each grade level for that year, and then compute the cumulative product of the survival rates. What

this means is that the survival curve cannot be interpreted as the experience of a single cohort, but all cohorts present during that particular year. I think this is reasonable because school system performance is affected not by the particular cohorts in play, but the policies, procedures, and circumstances in place during that year.

### Survival rates by gender

What are the differences between male and female survival rates? We flip the faceting to determine the answer to that question.




This chart yields two key observations about the gender differences in survival rates:

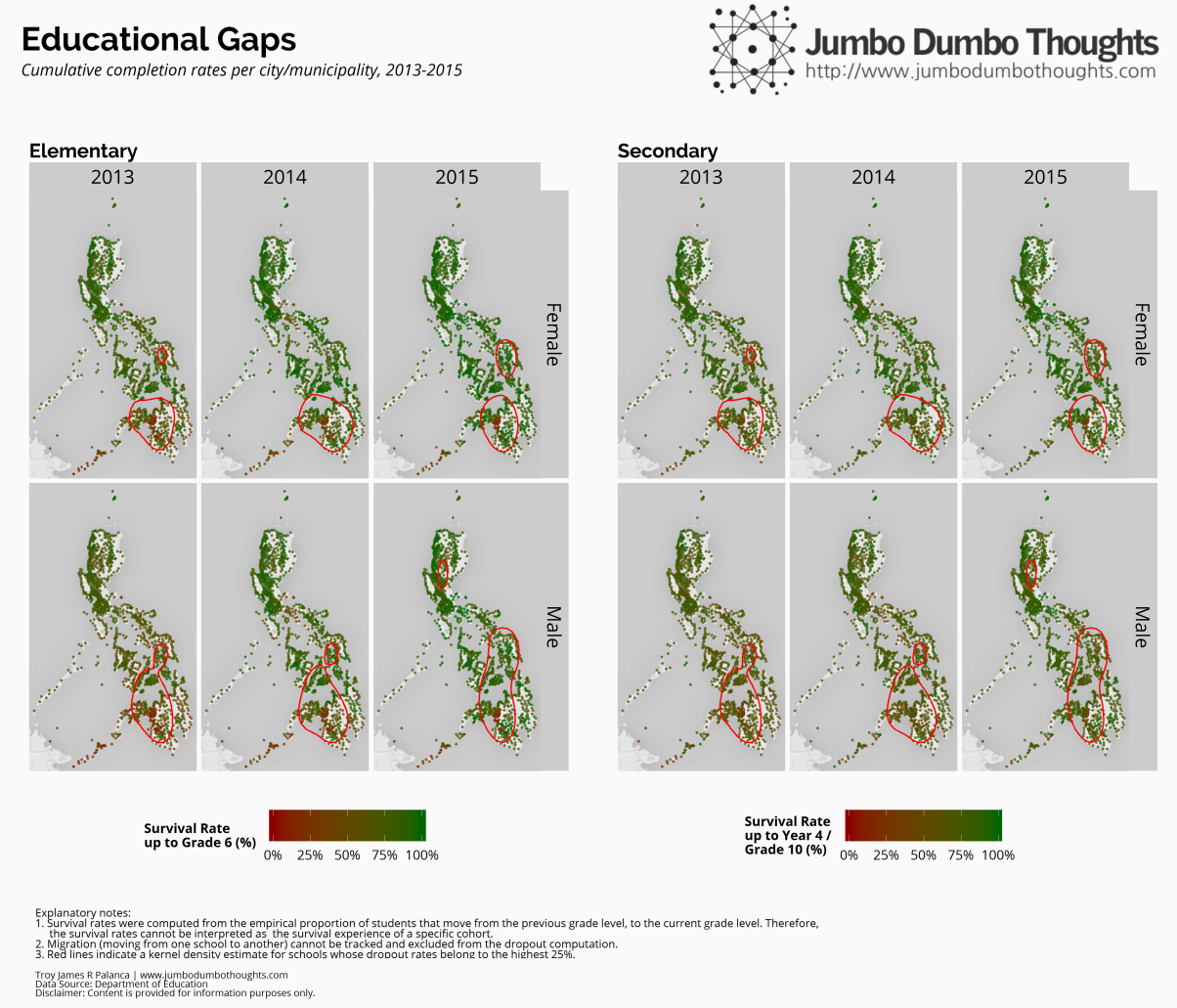
- Females are better at staying in school, but are given less chances to do so, especially during the transition from elementary to high school.
- Overall, females are still more likely to stay in school than males. Demographics, family needs, and will come into play.

## City/Municipality Level Cohort

Next, we want to analyze the differences across cities and municipalities in terms of survival rates.

### Survival maps

We first plot the cities and municipalites coded with the cumulative survival rate to determine whether there are any "dropout hotspots." We also add a density line that isolates concentrations of schools whose dropout rates belong to the worst 25%.




A constant hotspot of high dropout rates in the ARMM region, especially in Maguindanao. Recently, however, especially for males and for elementary schools, Eastern Visayas has also experienced drastic dropout rates. This may be the result of Supertyphoon Yolanda, a strong storm that rampaged across the region in November 2013.