



Why are Marriage Rates Declining?

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Abstract

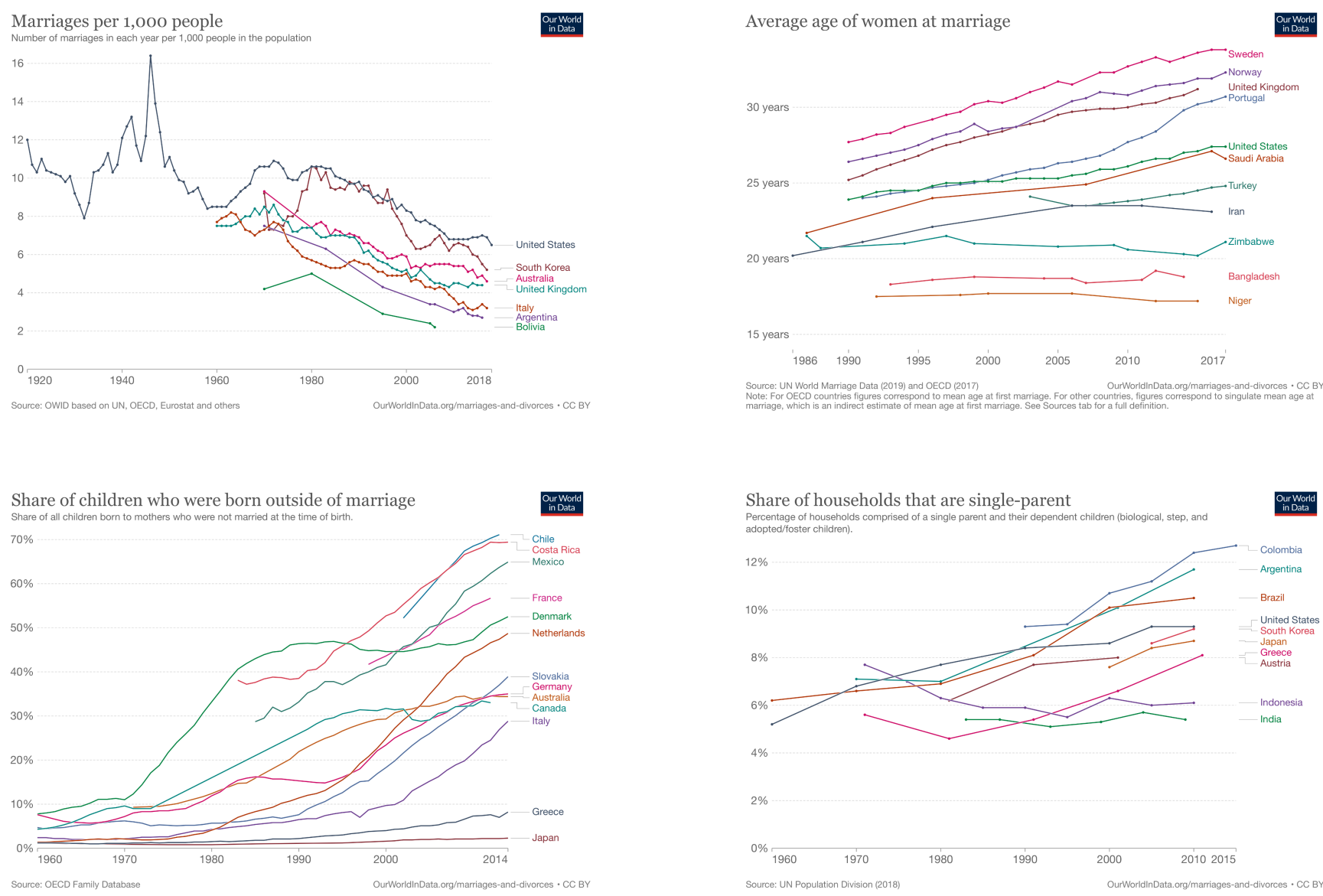
Marriages are becoming less common, in most countries the share of people getting married has fallen in recent decades. There has been a general upward trend in divorce rates globally since the 1970s, but this pattern varies country-to-country. Single parenting is common and has increased in recent decades across the world. In rich countries with available data the average length of marriage before divorce has been relatively stable.

Data Overview

1	Country	Year	Male_Life_Expectancy	female_Life_Expectancy	GDP	Marriage_rate	Same_sex_marriage	Births_outside_marriage	Divorce_rate
2	Australia	1990	73.879	80.036	17824.885721	6900	not legal	21.9	2.5
3	Australia	1995	75.367	81.183	22405.572327	6100	not legal	26.6	2.8
4	Australia	2000	76.917	82.255	28304.656736	5900	not legal	29.3	2.5999999

Estimated_average_age_at_marriage_women	births_per_woman	average_years_of_schooling_of_women_in_reproductive_age	Population_est
24.299999	1.863	11.66414	16960600
25.299999	1.825	11.79676	17993083
26.700001	1.762	11.66341	18991434

This poster briefly presents the data behind these fast and widespread changes, and discuss how some of the main relevant variables would affect divorce rates.



Method:

Linear Regression

Male_Life_Expectancy	9.724426
female_Life_Expectancy	8.176586
GDP	2.152865
Births_outside_marriage	1.467172
Divorce_rate	1.529365
births_per_woman	2.275783
Population_est	1.218831
judgment_divorce	1.507581

From the VIF, we can see that some variables have high multicollinearity that needs to be removed.

Male and female life expectancy VIF are pretty high, so we need to remove one of them

Predictors	Estimates	CI	p
(Intercept)	6130.08	-1943.04 — 14203.21	0.135
female Life Expectancy	-78.30	-181.32 — 24.72	0.135
GDP	-0.02	-0.04 — 0.00	0.123
Births outside marriage	-52.67	-65.13 — -40.22	<0.001
Divorce rate	281.05	38.83 — 523.27	0.023
births per woman	2746.69	1953.94 — 3539.43	<0.001
Population est	0.00	0.00 — 0.00	0.019
judgment divorce [1]	2394.11	38.89 — 4749.34	0.046
Observations	116		
R ² / R ² adjusted	0.537 / 0.507		

Figure 1
Linear regression summary table

Birth influence marriage rate a lot. Female life expectancy and gdp are negatively related. Probably because women in well developed countries can earn money as much as men, which can lead to a more careful consideration of marriage.

When countries variables included, Belgium, Croatia, Greece, Ireland, Mexico, Netherlands, and Slovenia have significance in 99% CI. Only Birth_outside_marriage and population estimate would have significance.

LASSO Regression

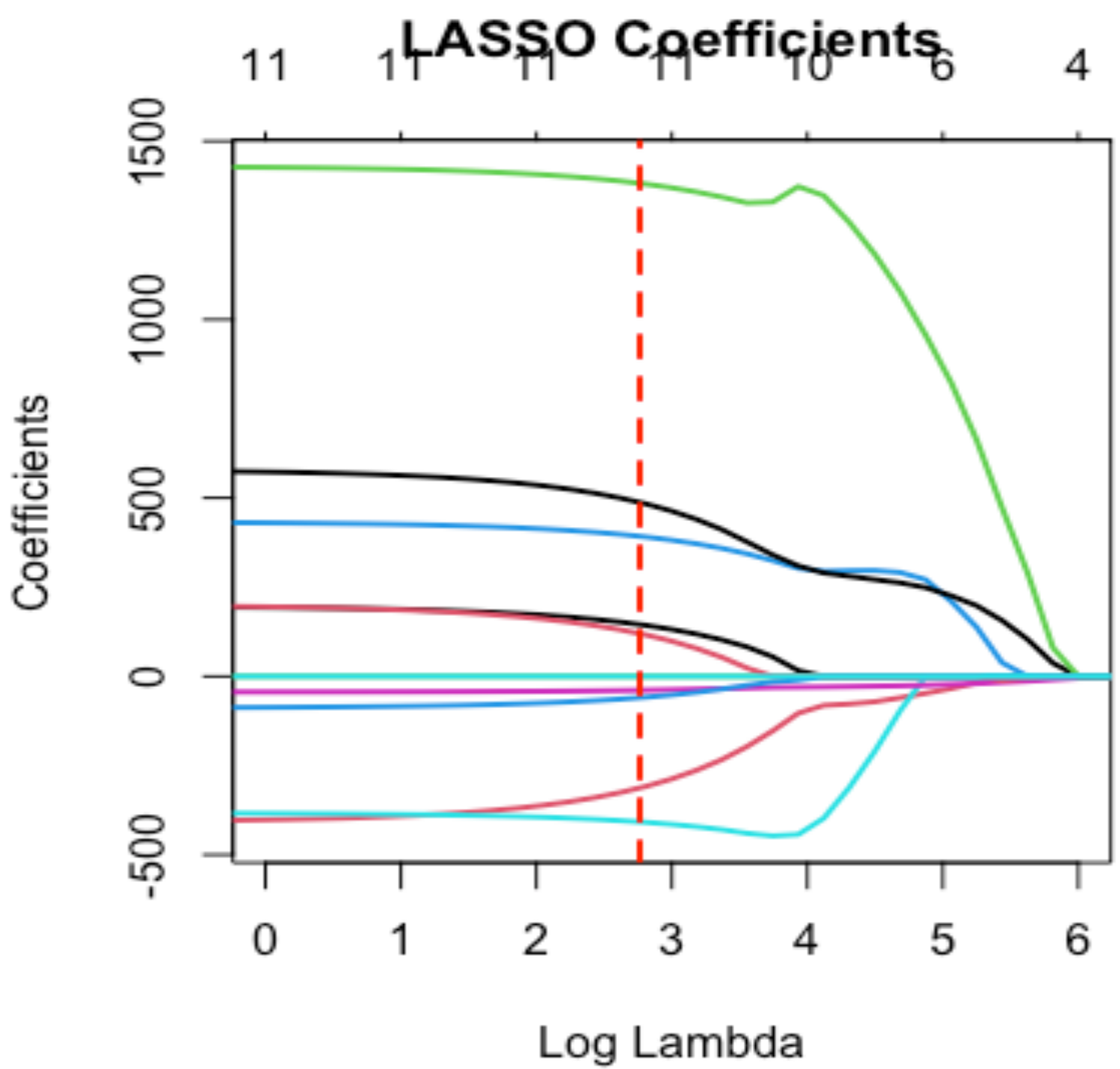


Figure 2
Subset of predictors that minimizes prediction error for a quantitative response variable.

Lasso regression performs regularization, which adds a penalty equal to the absolute value of the magnitude of coefficients. This type of regularization can result in sparse models with few coefficients; some coefficients can become zero and eliminated from the model.

The red dotted line represents the best log lambda value.

This LASSO coefficients plot indicate that there are 11 significant variables in our model.

Decision Tree

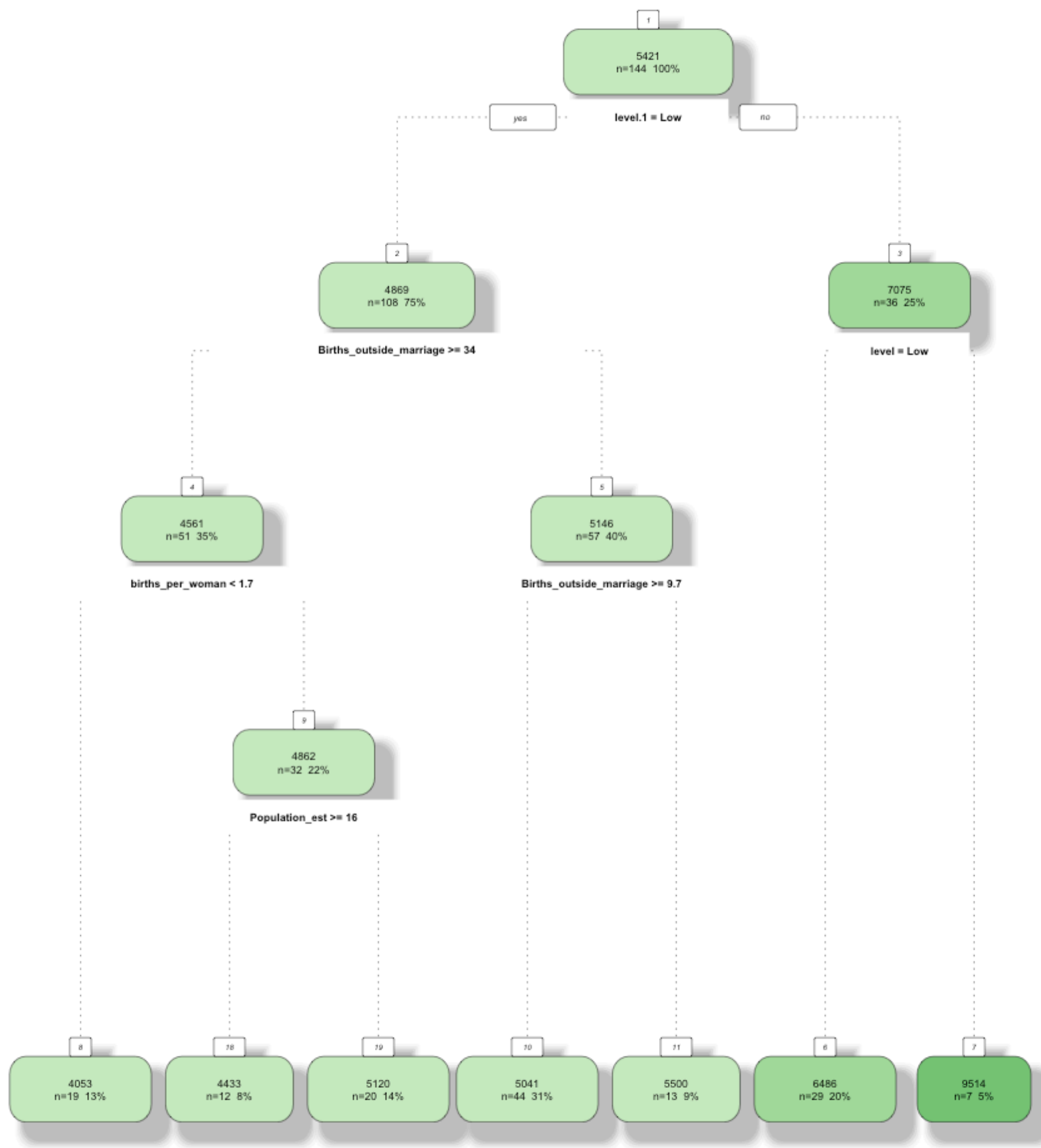


Figure 3
Pruned decision tree on marriage rates

This decision tree shows a process for determining the approximate value of marriage rates by comparing initial starting point, births outside marriages, births per women and population estimation variables. The starting point is 5,421. If the expected value is smaller than 5,421, then **YES**, otherwise **NO**.

Random Forest

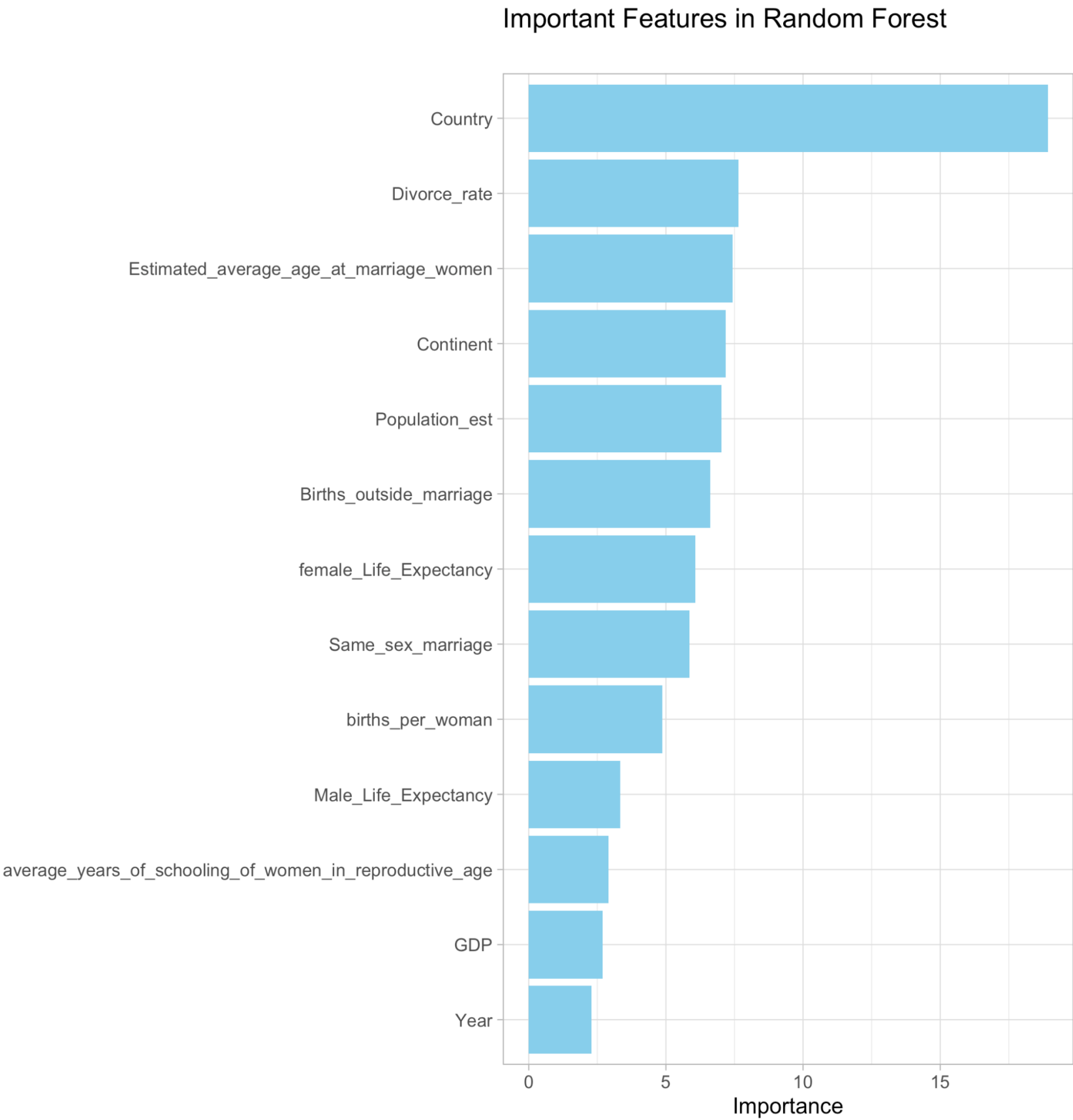


Figure 4
Important features in random forest

Random forest regression predicts by taking the **average of** the predictions made by each individual decision tree in the forest.

Country is considered the most important predictor; it is estimated that, if the Country variable was not included, the model error would increase by almost 20%.

Conclusions:

- The decline in marriage rate is a result of many factors.
- The LASSO regression model tells us that almost all the variables are significant when predicting marriage rate.
- The most influential and meaningful factors include country, births per woman, and country population.
- From the linear regression and random forest models, we can see that certain countries are significant factors for the declining marriage rates. This might be a result of the laws and social norms in these countries.

References

1. Marriages and Divorces, Our World Data, <https://ourworldindata.org/marriages-and-divorces>